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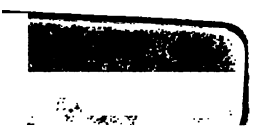
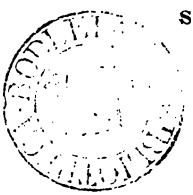


MENTAL

ARITHMETIC

SIMPLIFIED.



BY T. PIGOTT,

MASTER OF THE BRITISH SCHOOL, DONCASTER.

"IF IT WERE DONE, WHEN 'TIS DONE, THEN 'TWERE WELL,
"IT WERE DONE QUICKLY."—*Shakspeare.*

DONCASTER:

SOLD BY T. BROOKE AND CO. HIGH-STREET; C. WHITE, BAXTER-GATE; MASON AND SCOTT, LEEDS; AND WALKER, OTLEY.

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PREFACE.

It is not necessary that the Author should state all his reasons for publishing the following pages. Having found, in the practice of teaching, that all existing Mental Arithmetics were exceedingly deficient in arrangement, both in the Rules and Questions, he proceeded to make an entirely new, and what appeared to him, a natural arrangement for the use of his own school; and finding it to answer beyond his most sanguine expectations, it was suggested to him, by some of his friends, as being worthy of being offered to the public. Not willing to run any risk, he determined to offer it to be published by subscription, and the readiness by which it was met, by a numerous list of subscribers, is to him exceedingly gratifying, and he hopes that it will, in some measure, meet their expectations. He particularly presses upon all Parents or Teachers, who may use his book, to proceed upon the system laid down. To commence with exercising the senses, and developing the faculties. To teach principles, not isolated questions; and would particularly caution them against putting it into the hands of Children, as a task book. It is not formed for decreasing the Teacher's labour, but for increasing it.

INTRODUCTION.

THE advantages of Mental Arithmetic are so great that it ought to form one of the principal parts in the education of all classes. In preparing for the commercial transactions of life, its claims are the very first: but, independently of this, when properly taught, it is one of the best means of disciplining the mind, the demonstrations of number being so much easier than those of magnitude, and consequently more suitable for children.

In teaching, the first principles and examples must be made plain to the senses, by the use of the slate, or the black board. The first must be seen by intuition, and so on for all the rest: intuition the most thorough. The pupil must not advance one step into the regions of darkness, every succeeding operation should be based upon something previously known. For this purpose, the examples and rules are so arranged as the first shall require but one operation of mind, the second two, and so on. The examples under each rule are divided into two parts, to be learned in two distinct courses. The tables are all placed at the end of the book, and should be learned as they are wanted in the study of the rules, but learned most thoroughly, for upon a knowledge of tables and data depend the power of the Mental Arithmetician, and enable him to answer questions which, to the uninstructed, appear truly astonishing: an attainment not to be accomplished by a few lessons, learned in an irregular manner, but by a thorough training of the mental faculties, and clear views of the principles of Arithmetic.

MENTAL ARITHMETIC.

DEFINITIONS.

1.—Arithmetic is the science of numbers, and teaches the art of making calculations. The figures made use of are the following:—1, 2, 3, 4, 5, 6, 7, 8, 9, 0.

2.—MENTAL ARITHMETIC is the art of calculating by the mind, without the aid of symbols.

3.—NUMERATION teaches how to read, and notation how to write any number of figures.

4.—ADDITION teaches how to add two or more sums into one; as 8, 7, 12, 6 added together, the sum is 33.

5.—SUBTRACTION teaches how to take a less number from a greater, and shows the remainder or difference; as 7 taken from 22, the remainder is 15.

6.—MULTIPLICATION shews what one number will amount to when repeated a certain number of times; as 10 repeated 6 times will be 60.

7.—DIVISION teaches how to separate a given number into a certain number of parts; as 18, divided into 3 parts, each part will be 6.

8.—The following signs are used to express these rules:—
$+$ Addition; $-$ Subtraction; $\times$ Multiplication; $\div$ Division; $=$ equality; as $8 + 4 = 12$. $8 - 3 = 5$. $6 \times 6 = 36$. $36 \div 6 = 6$.

9.—An Integer or Unit is one whole number; as 1 yard, 1 shilling, or 1 penny.

10.—A part of 1 is called a fraction, and is thus written; $\frac{3}{8}$ (three eighths), or $\frac{3}{4}$ (three fourths). The bottom figure shews how many parts it is broken into, and is called the denominator; the top figure shews how many are taken, and is called the numerator.

SECTION 1.—ELEMENTARY RULES.

11.—In teaching the elementary rules it is best to begin with very low numbers, such as can be represented to the senses, and demonstrated to the eye by tangible objects, such as nuts, counters, marks on the slate, or black board, or upon an abacus. Children find great difficulty in comprehending abstract numbers; all questions put to them should be after the manner of the first examples under each rule, until they have clear views of number. The examples given here (and all through the book) are only specimens, a great many more should be given, and, advancing by very easy steps, from those which are more simple to those which are more difficult. Those who wish for any assistance in this department will find it in Knight's Arithmetic for Children.

12.—Addition (4).—James had 5 apples; George had 4. How many had they?

Add 8 to 5; 6 to 7; 9 to 11; 15 to 6; 25 to 7; 16 to 8; 27 to 6; 34 to 11; 7 and 8 to 15; 9 and 7 to 18; 8 and 6 to 24; 11 and 10 to 36; 6 and 22 to 34.

13.—Subtraction (5).—James had 8 nuts; the squirrel stole 4. How many had he left?

Take 3 from 5; 7 from 12; 9 from 16; 3 and 4 from 18; 8 and 2 from 45; 7 and 8 from 32; 15 and 8 from 46; 24 from 55.

14.—Multiplication (6).—How many eyes have 5 boys? How many fingers have 4 boys? How many legs have three horses?

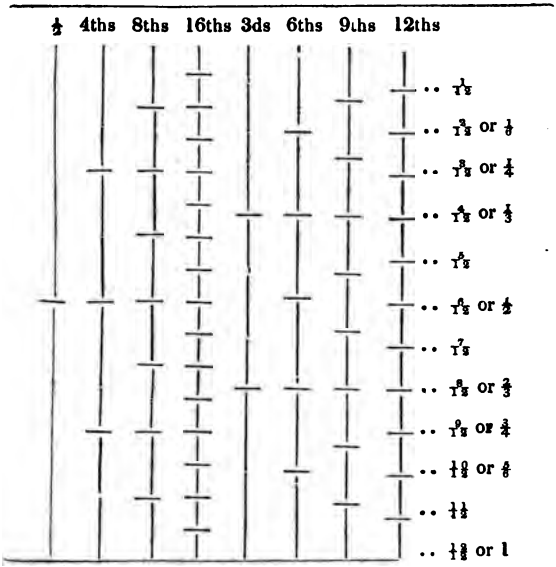
Three times 4; 6 times 8; 5 times 15; 3 times 25; 6 times 32; 8 times 75; 4 times 55; 3 times 122; 4 times 324; 7 times 426; 8 times 284; 4 times 3626.

15.—Division (7).—If 3 classes contain 24 boys, how many are there in each?

Divide 18 by 6; 35 by 7; 42 by 6; 48 by 3; 55 by 11; 82 by 9; 76 by 8; 224 by 4; 628 by 3; 784 by 4; 827 by 5; 9864 by 5.

SECTION 2.—OF FRACTIONS.

16.—Fractions (10) are parts of units. One of the best methods of teaching them is to take a line upon the black board, and divide it into an equal number of parts, and compare it with other lines of the same length, yet divided into different proportions, something like the following:—



The pupils should be questioned upon the various lines, and the relation of the various parts to a whole line, or to each other, something in the following manner:—which is ½, or ¼, or ⅓, or ⅜, or ⅞, or ⅔, &c. How many ¼ in ⅞? How many 8ths in ½? How many 9ths in ⅓? How many 12ths in ¾?

17.—Another method of teaching, is to take any particular number, and divide it into different parts, in the following manner:—as ½ of 12; ¼ of 12; ⅓ of 12; ⅙ of 12; ½ of 20; ½ of 20; ¼ of 20; 1/10 of 20; ⅖ of 20; ⅗ of 20; 7/10 of 20; ½ of 24; ¼ of 24; ⅛ of 24; ⅜ of 24; ⅙ of 24; 1/12 of 24; ¾ of 24; 5/12 of 24; ⅞ of 24; ⅔ of 24; 7/12 of 24.

18.—The following is a very good method of shewing the relation between fractions, and of developing the intellectual powers:—

$\frac{3}{8}$ of 12 equal how many 6ths of 12? Solution: $\frac{3}{8}$ of $12 = 8$; $\frac{1}{8}$ of $12 = 2$; and $8 \div 2 = 4$ *Ans.* $\frac{1}{8}$ of 24 equal how many 12ths of 24? $\frac{1}{8}$ of 20 equal how many 10ths of 20? $\frac{1}{2}$ of 16 equal how many 5ths of 20?

19.—Reduction.—The numerator and denominator of a fraction being multiplied or divided by the same figure, the value of the fraction remains the same.

20.—When the numerator is larger than the denominator, it is called an improper fraction, and is reduced by dividing the numerator by the denominator; as $\frac{3}{8} = 4\frac{3}{8}$.

21.—To add or subtract fractions, they must have like denominators, then add all the numerators together, and divide the sum by the common denominator; or for subtraction take the less numerator from the greater.

22.—Addition.—Add $\frac{1}{8}$ to $\frac{7}{8}$. $7 + 5 = 12$; then $12 \div 8 = 1\frac{4}{8}$ or (19) $1\frac{1}{2}$.

Add $\frac{1}{12}$ to $\frac{7}{12}$; $\frac{1}{4}$ to $\frac{7}{8}$; $\frac{1}{2}$ to $\frac{1}{4}$; $\frac{2}{3}$ to $\frac{1}{3}$; $\frac{5}{12}$ to $\frac{1}{6}$; $\frac{1}{2}$ to $\frac{3}{4}$; $\frac{1}{3}$ to $\frac{1}{4}$; $\frac{3}{5}$ to $\frac{7}{10}$.

23.—Subtraction.—Take $\frac{1}{2}$ from $\frac{3}{4}$. $\frac{1}{2} = \frac{2}{4}$; then $\frac{3}{4} - \frac{2}{4} = \frac{1}{4}$ *Ans.* $\frac{1}{4}$ from $\frac{7}{8}$; $\frac{3}{8}$ from $\frac{1}{2}$; $\frac{1}{3}$ from $\frac{2}{3}$; $\frac{1}{6}$ from $\frac{5}{12}$; $\frac{3}{4}$ from $\frac{7}{8}$; $\frac{9}{10}$ from $\frac{4}{5}$; $\frac{1}{3}$ from $1\frac{1}{3}$.

Note. The denominators in these questions have all a ratio to each other, and such only can be answered mentally by children. The general rules for the reduction of fractions to a common denominator are too complex to be inserted here.

24.—Multiplication.—To multiply a fraction by a whole number.—Rule. Multiply the numerator by the whole number; as $\frac{3}{4} \times 6 = \frac{18}{4}$ or (20) $4\frac{1}{2}$; $\frac{3}{8} \times 4 = \frac{12}{8}$ or $1\frac{1}{2}$.

Multiply $\frac{3}{8}$ by 8; $\frac{3}{4}$ by 10; $\frac{5}{6}$ by 4; $\frac{7}{8}$ by 3: $\frac{7}{10}$ by 5.

25.—To multiply a whole number by a fraction.—Rule. Multiply by the numerator, and divide by the denominator.—*Note:* Divide first, when you can without any remainder.—$16 \times \frac{7}{8}$; $16 \div 8 = 2 \times 7 =$ to 14: or $16 \times 7 = 112 \div 8 = 14$. *Ans.*

Multiply 20 by $\frac{1}{2}$; 24 by $\frac{3}{8}$; 12 by $\frac{1}{4}$; 18 by $\frac{2}{3}$; 15 by $\frac{2}{3}$; 11 by $\frac{3}{8}$; 30 by $\frac{3}{4}$; 54 by $\frac{1}{9}$.

26.—To multiply a fraction by a fraction.—RULE. Multiply all the numerators together for a new numerator, and all the denominators for a new denominator; as $\frac{1}{2} \times \frac{2}{3} = \frac{2}{6}$ (19) $= \frac{1}{3}$. *Ans.*

Multiply $\frac{7}{8}$ by $\frac{1}{2}$; $\frac{1}{2}$ by $\frac{1}{3}$; $\frac{3}{4}$ by $\frac{1}{3}$; $\frac{5}{10}$ by $\frac{1}{4}$; $\frac{3}{8}$ by $\frac{1}{3}$; $\frac{5}{10}$ by $\frac{2}{3}$; $\frac{5}{12}$ by $\frac{3}{8}$; $\frac{3}{4}$ by $\frac{4}{5}$; $\frac{2}{3}$ by $\frac{3}{12}$.

27.—Division.—To divide a fraction by a whole number.—RULE. Multiply the denominator, or divide the numerator, by the whole number; as $\frac{2}{10} \div 3 = \frac{2}{10}$: or $\frac{2}{10} \div 3 = \frac{2}{6}$ (19) $= \frac{2}{30}$. *Ans.*

Divide $\frac{7}{8}$ by 2; $\frac{2}{3}$ by 3; $\frac{3}{4}$ by 5; $\frac{5}{12}$ by 4.

28.—To divide a whole number by a fraction.—RULE. Multiply by the denominator, and divide by the numerator; as $8 \div \frac{2}{3}$: $8 \times 3 = 24$; $24 \div 2 = 12$; that is 12 times $\frac{2}{3}$, not 12 whole numbers.

Note. Divide first when you can.

Divide 9 by $\frac{1}{2}$; 12 by $\frac{3}{4}$; 16 by $\frac{7}{8}$; 20 by $\frac{2}{3}$.

Of the fractional parts of a pound and a shilling:—

OF A POUND.		s.	d.	OF A SHILLING.		d.
$\frac{1}{2}$	is equal to	10	0	$\frac{1}{2}$	is equal to....	6
$\frac{1}{4}$	....	5	0	$\frac{1}{4}$	....	3
$\frac{3}{4}$	....	15	0	$\frac{3}{4}$	....	9
$\frac{1}{3}$	....	6	8	$\frac{1}{3}$	....	4
$\frac{2}{3}$	....	13	4	$\frac{2}{3}$	....	8
$\frac{1}{6}$	....	3	4	$\frac{1}{6}$	....	2
$\frac{3}{5}$	....	10	0	$\frac{3}{5}$	....	6
$\frac{4}{5}$	....	16	8	$\frac{4}{5}$	....	10
$\frac{1}{10}$	....	2	6	$\frac{1}{10}$	....	$1\frac{1}{2}$
$\frac{3}{8}$	....	7	6	$\frac{3}{8}$	....	$4\frac{1}{2}$
$\frac{5}{8}$	....	12	6	$\frac{5}{8}$	....	$7\frac{1}{2}$
$\frac{7}{8}$	....	17	6	$\frac{7}{8}$	....	$10\frac{1}{2}$

29.—To divide a fraction by a fraction.—RULE. Multiply by the denominator, (24) and divide by the numerator (27); as $\frac{3}{5} \div \frac{2}{3} = \frac{9}{15} = \frac{3}{5}$, not $\frac{2}{3}$ of 1, but of $\frac{3}{5}$; or invert the divisor, and proceed as for multiplication (26); $\frac{2}{3} \div \frac{3}{5}$, invert the $\frac{3}{5}$ and say $\frac{2}{3} \times \frac{5}{3} = \frac{10}{9} = 2$. (37)

Divide $\frac{2}{3}$ by $\frac{3}{5}$; $\frac{7}{8}$ by $\frac{1}{4}$; $\frac{5}{12}$ by $\frac{2}{3}$; $\frac{3}{8}$ by $\frac{5}{10}$.

All these Rules should be demonstrated from the lines, when they apply, and from lines drawn to correspond to them; or from some particular number when they do not, in the following manner.

43.—To find the value of any number of articles, under 12, at any price under one shilling.

RULE.—Multiply the articles by the price, and you will have the answer in pence.

The above rule is self evident, it being only an exercise on the multiplication of pence table. (Appendix, No. 4.)

Example: $8\frac{1}{2}$ yards at 7d. ℔ yard.

$$7 \times 8\tfrac{1}{2} = 59\tfrac{1}{2}\text{d. or } 4\text{s. } 11\tfrac{1}{2}\text{d. } \textit{Ans.}$$

5	yards	@	4d.	℔	yard	*a*	5	lbs.	@	9d.	℔	lb.	*i*
3	..	..	7d.	..		*b*	7	..	..	11d.	..	..	*k*
7	..	..	7d.	..		*c*	3	..	..	9d.	..	..	*l*
7	..	..	9d.	..		*d*	8	..	..	7d.	..	..	*m*
9	..	..	11d.	..		*e*	6	..	..	11d.	..	..	*n*
11	..	..	11d.	..		*f*	6	..	..	8d.	..	..	*o*
8	..	..	9d.	..		*g*	5	..	..	7d.	..	..	*p*
9	..	..	10d.	..		*h*	8	..	..	11d.	..	..	*q*

$8\frac{1}{2}$	ounces	@	6d	℔	oz.	*a*	$6\frac{1}{2}$	yards	@	$7\frac{1}{2}$d.	℔	yard	*i*
$9\frac{3}{4}$	..	..	7d.	..		*b*	$4\frac{1}{2}$	..	..	$4\frac{1}{2}$d.	..		*k*
$11\frac{1}{4}$	..	..	5d.	..		*c*	$6\frac{3}{4}$	..	..	$9\frac{1}{2}$d.	..		*l*
$9\frac{1}{2}$	..	..	4d.	..		*d*	$8\frac{3}{4}$	..	..	$11\frac{1}{4}$d.	..		*m*
$7\frac{3}{4}$	..	..	5d.	..		*e*	$5\frac{1}{2}$	..	..	$8\frac{1}{4}$d.	..		*n*
$4\frac{1}{2}$	..	..	11d.	..		*f*	$7\frac{1}{4}$	..	..	$9\frac{1}{4}$d.	..		*o*
$11\frac{1}{4}$	..	..	10d.	..		*g*	$4\frac{3}{4}$	..	..	$10\frac{1}{4}$d.	..		*p*
$10\frac{1}{2}$	..	..	7d.	..		*h*	$11\frac{1}{2}$	..	..	$6\frac{1}{4}$d.	..		*q*

	£.	s.	d.
a	0	1	8
b	0	1	9
c	0	4	1
d	0	5	3
e	0	8	3
f	0	10	1
g	0	6	0
h	0	7	6

	£.	s.	d.
i	0	3	9
k	0	6	5
l	0	2	3
m	0	4	8
n	0	5	6
o	0	4	0
p	0	2	11
q	0	7	4

	£.	s.	d.
a	0	4	3
b	0	5	$8\frac{1}{4}$
c	0	4	$8\frac{1}{4}$
d	0	3	2
e	0	3	$2\frac{3}{4}$
f	0	4	$1\frac{1}{2}$
g	0	9	$9\frac{3}{4}$
h	0	6	$1\frac{1}{2}$

	£.	s.	d.
i	0	4	$0\frac{3}{4}$
k	0	1	$8\frac{1}{4}$
l	0	5	4
m	0	8	$6\frac{3}{4}$
n	0	3	$9\frac{1}{4}$
o	0	5	$11\frac{1}{4}$
p	0	4	$1\frac{3}{4}$
q	0	5	$11\frac{3}{4}$

SECTION 4.—COMMERCIAL NUMBERS.

43.—To find the value of one dozen articles, the price of one being given. (Appendix, No. 7.)

RULE.—Take the price in pence as shillings, and add for each farthing 3d.

Demonstration.—One dozen articles at 1d. each, will cost 1s.; and one dozen at ¼d. each, (¼ of 1s.) 3d.

Example.—One dozen lbs. at 3¼d. each. If 1 lb. cost 3d. 12 will cost 3s. If 1 lb cost ¼d. 12 will cost (¼ of 1s.) 9d.; 3s. 9d. per dozen. *Ans.*

1	dozen	@	3d.	each	*a*	1	dozen	@	8¼d.	each	*i*
1	..	..	5d.	..	*b*	1	..	..	7½d.	..	*k*
1	..	..	7d.	..	*c*	1	..	..	5¾d.	..	*l*
1	..	..	4d.	..	*d*	1	..	..	8¾d.	..	*m*
1	..	..	10d.	..	*e*	1	..	..	6s. 7d.	..	*n*
1	..	..	1s. 3d.	..	*f*	1	..	..	6s. 6d.	..	*o*
1	..	..	1s. 4d.	..	*g*	1	..	..	11s. 4d.	..	*p*
1	..	..	1s. 6d.	..	*h*	1	..	..	12s. 6d.	..	*q*

2	dozen	@	9¼d.	each	*a*	3	dozen	@	13s.	6d.	each	*i*
5	..	..	10½d.	..	*b*	4	..	..	14s.	8d.	..	*k*
4	..	..	1s. 2¼d.	..	*c*	6	..	..	16s.	4d.	..	*l*
6	..	..	1s. 6¼d.	..	*d*	3	..	..	18s.	6d.	..	*m*
7	..	..	1s. 8¾d.	..	*e*	2	..	..	15s.	6d.	..	*n*
9	..	..	8s. 7½d.	..	*f*	2	..	..	17s.	2¼d.	..	*o*
4	..	..	9s. 8¼d.	..	*g*	2	..	..	19s.	8¼d.	..	*p*
2	..	..	10s. 6¼d.	..	*h*	4	..	..	18s.	11½d.	..	*q*

	£.	*s.*	*d.*		£.	*s.*	*d.*		£.	*s.*	*d.*		£.	*s.*	*d.*
a	0	3	0	*i*	0	8	3	*a*	0	18	6	*i*	24	6	0
b	0	5	0	*k*	0	7	9	*b*	2	12	6	*k*	35	4	0
c	0	7	0	*l*	0	5	3	*c*	2	17	0	*l*	58	16	0
d	0	4	0	*m*	0	8	9	*d*	5	9	6	*m*	33	6	0
e	0	10	0	*n*	3	7	0	*e*	7	3	6	*n*	18	12	0
f	0	15	0	*o*	3	18	0	*f*	46	9	3	*o*	20	13	0
g	0	16	0	*p*	6	16	0	*g*	23	6	0	*p*	23	13	6
h	0	18	0	*q*	7	10	0	*h*	12	13	0	*q*	45	10	0

44.—To find the value of one article, the rate per dozen being given. (Appendix, No. 7.)

RULE.—Reckon 1d. for every shilling, and ¼d. for every 3d. in the rate per dozen.

Demonstration.—If twelve articles cost 12d. one article will cost 1d. If twelve articles cost ¼ of 12d. one will cost ¼d.

Example.—One ℔ of moulds at 9s. 9d. per dozen. 9s. for 12 ℔s. will be 9d. for 1 ℔.; and 9d. (¼ of a 1s.) for 12 ℔s. will be ¼d. for 1 ℔.; 9¼d. per ℔. *Ans.*

1	article	@	12s.	℔	doz.	*a*	1	article	@	4s.	3d.	℔	doz.	*i*
1	..	..	4s.	..	..	*b*	1	..	..	7s.	6d.	..		*k*
1	..	..	7s.	..	..	*c*	1	..	..	10s.	9d.	..		*l*
1	..	..	13s.	..	..	*d*	1	..	..	3s.	6d.	..		*m*
1	..	..	8s.	..	..	*e*	1	..	..	15s.	3d.	..		*n*
1	..	..	10s.	..	..	*f*	1	..	..	18s.	9d.	..		*o*
1	..	..	6s.	..	..	*g*	1	..	..	17s.	6d.	..		*p*
1	..	..	18s.	..	..	*h*	1	..	..	11s.	3d.	..		*q*

1	article	@	6s.	8d.	℔	doz. *a*	6	articles	@	9s.	3d.	℔	doz.	*i*
1	..	..	7s.	4d.	..	*b*	8	..	..	4s.	9d.	..		*k*
1	..	..	11s.	10d.	..	*c*	10	..	..	5s.	6d.	..		*l*
1	..	..	7s.	8d.	..	*d*	11	..	..	8s.	6d.	..		*m*
1	..	..	27s.	7d.	..	*e*	14	..	..	15s.	9d.	..		*n*
1	..	..	44s.	8d.	..	*f*	17	..	..	18s.	6d.	..		*o*
1	..	..	17s.	4d.	..	*g*	20	..	..	20s.	6d.	..		*p*
1	..	..	83s.	3d.	..	*h*	20	..	..	24s.	3d.	..		*q*

	£.	s.	d.		£.	s.	d.		£.	s.	d.		£.	s.	d.
a	0	1	0	*i*	0	0	4½	*a*	0	0	6½	*i*	0	4	7½
b	0	0	4	*k*	0	0	7½	*b*	0	0	7½	*k*	0	3	2
c	0	0	7	*l*	0	0	10½	*c*	0	0	11½	*l*	0	4	7
d	0	1	1	*m*	0	0	3½	*d*	0	0	7½	*m*	0	7	9½
e	0	0	8	*n*	0	1	3½	*e*	0	2	3½	*n*	0	18	4½
f	0	0	10	*o*	0	1	6½	*f*	0	3	8½	*o*	1	6	2½
g	0	0	6	*p*	0	1	5½	*g*	0	1	5½	*p*	1	14	2
h	0	1	6	*q*	0	0	11½	*h*	0	6	11½	*q*	2	0	5

45.—To find the value of one score, the price of one article being given. (Appendix, No. 7.)

RULE.—Take the price in shillings as pounds. If pence occur, take the aliquot parts of a pound that they are of a shilling. (28)

Demonstration.—If one article cost 1s. twenty will cost 20s.; if one article cost any fraction of a shilling, twenty will cost the same fraction of a pound.

Example.—One score articles at 4s. 8d. each; 20 articles, at 4s. each, will be £4. and 20 articles at 8d. each ($\frac{2}{3}$ of 1s.), will be 13s. 4d. ($\frac{2}{3}$ of £1.); £4. 13s. 4d. *Ans.*

1	score	@	4s.	each	*a*	1	score	@	8s. 6d.	each	*i*
1	..	..	6s.	..	*b*	1	..	..	5s. 6d.	..	*k*
1	..	..	7s.	..	*c*	1	..	..	6s. 3d.	..	*l*
1	..	..	18s.	..	*d*	1	..	..	2s. 3d.	..	*m*
1	..	..	20s.	..	*e*	1	..	..	5s. 3d.	..	*n*
1	..	..	25s.	..	*f*	1	..	..	8s. 9d.	..	*o*
1	..	..	75s.	..	*g*	1	..	..	4s. 6d.	..	*p*
1	..	..	47s.	..	*h*	1	..	..	10s. 9d.	..	*q*

2	score	@	6s.	3d.	each	*a*	10	score	@	6s.	4d.	each *i*
3	..	..	3s.	4d.	..	*b*	9	..	..	26s.	4d.	.. *k*
4	..	..	4s.	6d.	..	*c*	8	..	..	45s.	7½d.	.. *l*
5	..	..	5s.	8d.	..	*d*	15	..	..	20s.	9d.	.. *m*
2	..	..	16s.	1½d.	..	*e*	12	..	..	30s.	10½d.	.. *n*
3	..	..	15s.	6d.	..	*f*	7	..	..	15s.	8d.	.. *o*
3	..	..	18s.	7½d.	..	*g*	160	sheep	..	40s.	6d.	.. *p*
4	..	..	14s.	2d.	..	*h*	220	yards	..	25s.	9d.	.. *b*

	£.	s.	d.		£.	s.	d.		£.	s.	d.		£.	s.	d.
a	4	0	0	*i*	8	10	0	*a*	12	10	0	*i*	63	6	8
b	6	0	0	*k*	5	10	0	*b*	10	0	0	*k*	237	0	0
c	7	0	0	*l*	6	5	0	*c*	13	0	0	*l*	365	0	0
d	18	0	0	*m*	2	5	0	*d*	26	6	8	*m*	311	5	0
e	20	0	0	*n*	5	5	0	*e*	32	5	0	*n*	370	10	0
f	25	0	0	*o*	8	15	0	*f*	46	10	0	*o*	109	13	4
g	75	0	0	*p*	4	10	0	*g*	55	17	6	*p*	324	0	0
h	47	0	0	*q*	10	15	0	*h*	56	13	4	*q*	293	5	0

46.—To find the value of a single article, at a certain rate per score. (Appendix, No. 7.)

Rule.—Reckon a shilling for every pound in the price. If shillings or pence occur take aliquot parts of a shilling that they are of a pound. (28)

Demonstration.—If twenty yards cost £1. one yard will cost 1s. If twenty yards cost any fraction of £1. one yard will cost the same fraction of 1s.

Example.—What will one pig cost, if one score cost £9. 13s. 4d. ? 20 at £9. will be 9s. for one, and 20 at 13s. 4d. ($\frac{2}{3}$ of £1.) will be 8d. ($\frac{2}{3}$ of 1s.); 9s. 8d. *Ans.*

1 article	@	£.	s.	d.	℔ score	
1	.. ..	4	0	0	..	*a*
1	.. ..	8	0	0	..	*b*
1	.. ..	9	0	0	..	*c*
1	.. ..	12	0	0	..	*d*
1	.. ..	9	10	0	..	*e*
1	.. ..	14	10	0	..	*f*
1	.. ..	20	0	0	..	*g*
1	.. ..	30	0	0	..	*h*

1 article	@	£.	s.	d.	℔ score	
1	.. ..	12	5	0	..	*i*
1	.. ..	14	15	0	..	*k*
1	.. ..	27	5	0	..	*l*
1	.. ..	30	15	0	..	*m*
1	.. ..	36	5	0	..	*n*
1	.. ..	90	10	0	..	*o*
1	.. ..	48	15	0	..	*p*
1	.. ..	59	10	0	..	*q*

1 ditto	@	£.	s.	d.	ditto	
1	.. ..	9	4	0	ditto	*a*
1	.. ..	10	3	4	..	*b*
1	.. ..	18	13	4	..	*c*
1	.. ..	21	6	8	..	*d*
1	.. ..	25	7	6	..	*e*
1	.. ..	36	12	6	..	*f*
1	.. ..	40	2	6	..	*g*
1	.. ..	30	17	6	.	*h*

2 ditto	@	£.	s.	d.	ditto	
2	.. ..	10	10	0	ditto	*i*
7	.. ..	12	6	8	..	*k*
8	.. ..	15	15	0	..	*l*
9	.. ..	16	10	0	..	*m*
5	.. ..	24	6	8	.	*n*
18	.. ..	20	13	4	..	*o*
15	.. ..	30	10	0	..	*p*
120	.. ..	20	3	4	..	*q*

	£.	s.	d.
a	0	4	0
b	0	8	0
c	0	9	0
d	0	12	0
e	0	9	6
f	0	14	6
g	1	0	0
h	1	10	0

	£.	s.	d.
i	0	12	3
k	0	14	9
l	1	7	3
m	1	10	9
n	1	16	3
o	4	10	6
p	2	8	9
q	2	10	6

	£.	s.	d.
a	0	9	2½
b	0	10	2
c	0	18	8
d	1	1	4
e	1	5	4½
f	1	16	7½
g	2	0	1½
h	1	10	10½

	£.	s.	d.
i	1	1	0
k	4	6	4
l	6	6	0
m	7	8	6
n	6	1	8
o	18	12	0
p	22	17	6
q	121	0	0

47.—To find the value of one gross, the price of one article being given. (Appendix, No. 7.)

RULE.—Take the farthings as shillings, and multiply by 3, or take the pence as shillings, and multiply by 12.

Demonstration.—Taking farthings as shillings is equal to multiplying by 48, and 3 times 48 is equal to 144. Taking pence as shillings is equal to multiplying by 12, and $12 \times 12 = 144$.

Example.—One Gross at 6¼d. 6¼ equal 27 qrs., and 3 times 27 equal 81s. or £4. 1s. *Ans.*

1	gross	@	2¼d.	each	*a*	1	gross	@	11¼d.	each	*i*
1	..	..	3d.	..	*b*	1	..	..	13d.	..	*k*
1	..	..	4¼d.	..	*c*	1	..	..	7½d.	..	*l*
1	..	..	5¼d.	..	*d*	1	..	..	15d.	..	*m*
1	..	..	9d.	..	*e*	1	..	..	18d.	..	*n*
1	..	..	8¼d.	..	*f*	1	..	..	6d.	..	*o*
1	..	..	10½d.	..	*g*	1	..	..	10d.	..	*p*
1	..	..	3¾d.	..	*h*	1	..	..	3¼d.	..	*q*

2	gross	@	4½d.	each	*a*	8	gross	@	5¼d.	each	*i*
3	..	..	3¾d.	..	*b*	10	..	..	8¾d.	..	*k*
4	..	..	2¼d.	..	*c*	15	..	..	4¾d.	..	*l*
6	..	..	3¼d.	..	*d*	14	..	..	6¾d.	..	*m*
2	..	..	5¾d.	..	*e*	17	..	..	5¾d.	..	*n*
6	..	..	8¾d.	..	*f*	20	..	..	10d.	..	*o*
7	..	..	6¾d.	..	*g*	20	..	..	11¼d.	..	*p*
4	..	..	7¾d.	..	*h*	18	..	..	14d.	..	*q*

	£.	*s.*	*d.*		£.	*s.*	*d.*		£.	*s.*	*d.*		£.	*s.*	*d.*
a	1	7	0	*i*	6	15	0	*a*	5	8	0	*i*	25	4	0
b	1	16	0	*k*	7	16	0	*b*	6	15	0	*k*	51	0	0
c	2	14	0	*l*	4	10	0	*c*	5	8	0	*l*	40	10	0
d	3	3	0	*m*	9	0	0	*d*	12	12	0	*m*	52	10	0
e	5	8	0	*n*	10	16	0	*e*	6	12	0	*n*	58	13	0
f	4	19	0	*o*	3	12	0	*f*	30	12	0	*o*	120	0	0
g	6	6	0	*p*	6	0	0	*g*	26	5	0	*p*	135	0	0
h	2	2	0	*q*	1	19	0	*h*	18	0	0	*q*	151	4	0

46.—To find the value of a single article, at a certain rate per score. (Appendix, No. 7.)

Rule.—Reckon a shilling for every pound in the price. If shillings or pence occur take aliquot parts of a shilling that they are of a pound. (28)

Demonstration.—If twenty yards cost £1. one yard will cost 1s. If twenty yards cost any fraction of £1. one yard will cost the same fraction of 1s.

Example.—What will one pig cost, if one score cost £9. 13s. 4d. ? 20 at £9. will be 9s. for one, and 20 at 13s. 4d. ($\frac{2}{3}$ of £1.) will be 8d. ($\frac{2}{3}$ of 1s.); 9s. 8d. *Ans.*

1 article	@	£.	s.	d.	℔ score	
1	..	4	0	0	..	a
1	..	8	0	0	..	b
1	..	9	0	0	..	c
1	..	12	0	0	..	d
1	..	9	10	0	..	e
1	..	14	10	0	..	f
1	..	20	0	0	..	g
1	..	30	0	0	..	h

1 article	@	£.	s.	d.	℔ score	
1	..	12	5	0	..	i
1	..	14	15	0	..	k
1	..	27	5	0	..	l
1	..	30	15	0	..	m
1	..	36	5	0	..	n
1	..	90	10	0	..	o
1	..	48	15	0	..	p
1	..	50	10	0	..	q

1 ditto	@	£.	s.	d.	ditto	
1	..	9	4	0	..	a
1	..	10	3	4	..	b
1	..	18	13	4	..	c
1	..	21	6	8	..	d
1	..	25	7	6	..	e
1	..	36	12	6	..	f
1	..	40	2	6	..	g
1	..	30	17	6	.	h

2 ditto	@	£.	s.	d.	ditto	
2	..	10	10	0	ditto	i
7	..	12	6	8	..	k
8	..	15	15	0	..	l
9	..	16	10	0	..	m
5	..	24	6	8	.	n
18	..	20	13	4	..	o
15	..	30	10	0	..	p
120	..	20	3	4	..	q

	£.	s.	d.
a	0	4	0
b	0	8	0
c	0	9	0
d	0	12	0
e	0	9	6
f	0	14	6
g	1	0	0
h	1	10	0

	£.	s.	d.
i	0	12	3
k	0	14	9
l	1	7	3
m	1	10	9
n	1	16	3
o	4	10	6
p	2	8	9
q	2	10	6

	£.	s.	d.
a	0	9	2½
b	0	10	2
c	0	18	8
d	1	1	4
e	1	5	4½
f	1	16	7½
g	2	0	1½
h	1	10	10½

	£.	s.	d.
i	1	1	0
k	4	6	4
l	6	6	0
m	7	8	6
n	6	1	8
o	18	12	0
p	22	17	6
q	121	0	0

47.—To find the value of one gross, the price of one article being given. (Appendix, No. 7.)

RULE.—Take the farthings as shillings, and multiply by 3, or take the pence as shillings, and multiply by 12.

Demonstration.—Taking farthings as shillings is equal to multiplying by 48, and 3 times 48 is equal to 144. Taking pence as shillings is equal to multiplying by 12, and $12 \times 12 = 144$.

Example.—One Gross at 6¼d. 6¼ equal 27 qrs., and 3 times 27 equal 81s. or £4. 1s. *Ans.*

1	gross	@	2¼d.	each	*a*	1	gross	@	11¼d.	each	*i*
1	..	..	3d.	..	*b*	1	..	..	13d.	..	*k*
1	..	..	4½d.	..	*c*	1	..	..	7½d.	..	*l*
1	..	..	5¼d.	..	*d*	1	..	..	15d.	..	*m*
1	..	..	9d.	..	*e*	1	..	..	18d.	..	*n*
1	..	..	8¼d.	..	*f*	1	..	..	6d.	..	*o*
1	..	..	10½d.	..	*g*	1	..	..	10d.	..	*p*
1	..	..	3¾d.	..	*h*	1	..	..	3¼d.	..	*q*

2	gross	@	4¼d.	each	*a*	8	gross	@	5¼d.	each	*i*
3	..	..	3¾d.	..	*b*	10	..	..	8¾d.	..	*k*
4	..	..	2¼d.	..	*c*	15	..	..	4¾d.	..	*l*
6	..	..	3¼d.	..	*d*	14	..	..	6¾d.	..	*m*
2	..	..	5¾d.	..	*e*	17	..	..	5¾d.	..	*n*
6	..	..	8¾d.	..	*f*	20	..	..	10d.	..	*o*
7	..	..	6¾d.	..	*g*	20	..	..	11¼d.	..	*p*
4	..	..	7¾d.	..	*h*	18	..	..	14d.	..	*q*

	£.	*s.*	*d.*
a	1	7	0
b	1	16	0
c	2	14	0
d	3	3	0
e	5	8	0
f	4	19	0
g	6	6	0
h	2	2	0

	£.	*s.*	*d.*
i	6	13	0
k	7	16	0
l	4	10	0
m	9	0	0
n	10	16	0
o	3	12	0
p	6	9	0
q	1	19	0

	£.	*s.*	*d.*
a	5	8	0
b	6	15	0
c	5	8	0
d	12	12	0
e	6	12	0
f	30	12	0
g	26	5	0
h	18	0	0

	£.	*s.*	*d.*
i	25	4	0
k	51	0	0
l	40	10	0
m	52	10	0
n	58	13	0
o	120	0	0
p	135	0	0
q	151	4	0

48.—To find the value of one article, the price per gross being given. (Appendix, No. 7.)

Rule.—Reckon the shillings of the price as pence, and divide them by 12.

Demonstration.—Taking shillings as pence is equal to dividing by 12, and then dividing again by 12, is equal to dividing by 144.

Example.—One article at £3. 6s. per gross. £3. 6s. = 66s. 66d. divided by 12 = 5½d. *Ans.*

1	article	@	12s.	℔	gross	*a*	1	article	@	192s.	℔	gross	*i*
1	..	..	60s.	..		*b*	1	..	..	48s.	..		*k*
1	..	..	72s.	..		*c*	1	..	..	84s.	..		*l*
1	..	..	24s.	..		*d*	1	..	..	96s.	..		*m*
1	..	..	120s.	..		*e*	1	..	..	108s.	..		*n*
1	..	..	36s.	..		*f*	1	..	..	144s.	..		*o*
1	..	..	132s.	..		*g*	1	..	..	156s.	..		*p*
1	..	..	180s.	..		*h*	1	..	..	168s.	..		*q*

1	article	@	42s.	℔	gross	*a*	2	articles	@	147s.	℔	gross	*i*
1	..	..	75s.	..		*b*	3	..	..	162s.	..		*k*
1	..	..	27s.	..		*c*	4	..	..	129s.	..		*l*
1	..	..	90s.	..		*d*	7	..	..	132s.	..		*m*
1	..	..	30s.	..		*e*	8	..	..	99s.	..		*n*
1	..	..	39s.	..		*f*	5	..	..	87s.	..		*o*
1	..	..	45s.	..		*g*	6	..	..	183s.	..		*p*
1	..	..	66s.	..		*h*	8	..	..	195s.	..		*q*

	£.	s.	d.		£.	s.	d.
a	0	0	1	*i*	0	1	4
b	0	0	5	*k*	0	0	4
c	0	0	6	*l*	0	0	7
d	0	0	2	*m*	0	0	8
e	0	0	10	*n*	0	0	9
f	0	0	3	*o*	0	1	0
g	0	0	11	*p*	0	1	1
h	0	1	3	*q*	0	1	2

	£.	s.	d.		£.	s.	d.
a	0	0	3½	*i*	0	2	0½
b	0	0	6½	*k*	0	3	4½
c	0	0	2½	*l*	0	3	7
d	0	0	7½	*m*	0	6	5
e	0	0	2½	*n*	0	5	6
f	0	0	3½	*o*	0	2	0½
g	0	0	3½	*p*	0	7	7½
h	0	0	5½	*q*	0	10	10

49.—To find the value of 100 articles, the price of one being given.

RULE.—For every farthing, take as many pence, and twice as many shillings; or when pence only are given, multiply 8s. 4d. (100d.) by the number of pence in the price.

Demonstration.—Taking farthings as shillings is equal to multiplying by 48, and taking qrs. as pence, equal to multiplying by 4, then $48 \times 2 + 4 = 100$.

Example.—One hundred oak trees, at 3¼d. each; $3\frac{1}{4} = 15$ qrs. then twice 15s. and 15d. = £1. 11s. 3d. *Ans.*

100 yards	@	3d.	℔	yard	*a*	100 yards	@	3¼d.	℔	yard	*i*
..	..	5d.	..		*b*	..	..	4¼d.	..		*k*
..	..	6d.	..		*c*	..	..	5¼d.	..		*l*
..	..	7d.	..		*d*	..	..	6¼d.	..		*m*
..	..	8d.	..		*e*	..	..	7¼d.	..		*n*
..	..	9d.	..		*f*	..	..	8¼d.	..		*o*
..	..	10d.	..		*g*	..	..	9¼d.	..		*p*
..	..	11d.	..		*h*	..	..	11¼d.	..		*q*

200 yards	@	13d.	℔	yard	*a*	400 yards	@	2s.	0d.	℔ yd.	*i*
400	.. ..	14d.	..		*b*	600	.. ..	1s.	6d.	..	*k*
300	.. ..	16d.	..		*c*	700	.. ..	3s.	2d.	..	*l*
800	.. ..	15d.	..		*d*	200	.. ..	2s.	1d.	..	*m*
600	.. ..	13½d.	..		*e*	500	.. ..	2s.	6¼d.	..	*n*
700	.. ..	14½d.	..		*f*	600	.. ..	3s.	0½d.	..	*o*
800	.. ..	17½d.	..		*g*	700	.. ..	1s.	9½d.	..	*p*
400	.. ..	17¼d.	..		*h*	800	.. ..	1s.	11½d.	..	*q*

	£.	*s.*	*d.*		£.	*s.*	*d.*		£.	*s.*	*d.*		£.	*s.*	*d.*
a	1	5	0	*i*	1	7	1	*a*	10	10	0		40	0	0
b	2	1	8	*k*	1	17	6	*b*	23	6	8	*k*	45	0	0
c	2	10	0	*l*	2	3	9	*c*	20	0	0	*l*	110	16	8
d	2	18	4	*m*	2	14	2	*d*	50	0	0	*m*	20	16	8
e	3	6	8	*n*	3	0	5	*e*	33	2	6	*n*	63	0	5
f	3	15	0	*o*	3	12	11	*f*	42	5	10	*o*	91	5	0
g	4	3	4	*p*	3	19	2	*g*	50	3	4	*p*	63	8	9
h	4	11	8	*q*	4	17	11	*h*	28	15	0	*q*	78	6	8

50.—To find the value of one stone, the price per lb. being given. (Appendix, No. 8.)

RULE.—Take as many shillings, and twice as many pence as there are pence in the price, for every farthing add 3½d.

Demonstration.—One stone, at 1d. = 1s. 2d.; and 1 stone, at ¼d. = 3½d.

Example.—One stone of soap, at 5¼d. per lb.; 5s. and twice 5d. = 5s. 10d. + 3½d. = 6s. 1½d. *Ans.*

1	stone	@	3d.	℔	lb	*a*	1	stone	@	14d.	℔	lb	*i*
1	..	..	7d.	..		*b*	1	..	..	15d.	..		*k*
1	..	..	6d.	..		*c*	1	..	..	11d.	..		*l*
1	..	..	2d.	..		*d*	1	..	..	18d.	..		*m*
1	..	..	8d.	..		*e*	1	..	..	20d.	.		*n*
1	..	..	9d.	..		*f*	1	..	..	16d.	..		*o*
1	..	..	4d.	..		*g*	1	..	..	17d.	..		*p*
1	..	..	10d.	..		*h*	1	..	..	23d.	..		*q*

1	stone	@	2¼d.	℔	lb	*a*	3	stones	@	8½d.	℔	lb	*i*
1	..	..	3½d.	..		*b*	6	..	..	9½d.	.		*k*
1	..	..	4¼d.	..		*c*	7	..	..	5¼d.	..		*l*
1	..	..	16½d.	..		*d*	5	..	..	16½d.	..		*m*
1	..	..	18¼d.	..		*e*	4	..	.	15¼d.	..		*n*
1	..	..	20½d.	..		*f*	10	..	..	4¼d.	..		*o*
1	..	..	11½d.	.		*g*	15	..	..	7½d.	..		*p*
1	..	..	17¼d.	..		*h*	9	..	..	14½d.	..		*q*

	£.	*s.*	*d.*		£.	*s.*	*d.*		£.	*s.*	*d.*		£.	*s.*	*d.*
a	0	3	6	*i*	0	16	4	*a*	0	2	7½	*i*	1	8	10½
b	0	8	2	*k*	0	17	6	*b*	0	4	1	*k*	3	6	6
c	0	7	0	*l*	0	12	10	*c*	0	5	6½	*l*	2	6	11½
d	0	2	4	*m*	1	1	0	*d*	0	19	3	*m*	4	16	3
e	0	9	4	*n*	1	3	4	*e*	1	1	3½	*n*	3	13	6
f	0	10	6	*o*	0	18	8	*f*	1	4	2½	*o*	2	9	7
g	0	4	8	*p*	0	19	10	*g*	0	13	5	*p*	6	11	3
h	0	11	8	*q*	1	6	10	*h*	1	0	8½	*q*	7	12	3

51.—To find the value of a pound, at any price per ounce, avoirdupois. (Appendix, No. 8.)

RULE.—Take the price in farthings as shillings, and divide by 3. (Appendix, Nos. 3 and 6.)

Demonstration.—Taking farthings as shillings is equal to multiplying by 48; and multiplying by 48, and dividing by 3, is equal to multiplying by 16.

Example.—One lb. at 7½d. per ounce; 7½ = 30 qrs. and 30 qrs. taken as shillings, and divided by 3 = 10s. *Ans.*

Note. For troy weight the rule for dozens will answer.

1	lb	@	2¼d.	℔	ounce	*a*	1	lb	@	7½d.	℔	ounce	*i*
1	..	..	1½d.	..		*b*	1	..	..	10½d.	..		*k*
1	..	..	3d.	..		*c*	1	..	..	11¼d.	..		*l*
1	..	..	4½d.	..		*d*	1	..	..	12¼d.	..		*m*
1	..	..	5¼d.	..		*e*	1	..	..	15d.	..		*n*
1	..	..	6¼d.	..		*f*	1	..	..	20¼d.	..		*o*
1	..	..	3¾d.	..		*g*	1	..	..	24d.	..		*p*
1	..	..	8¼d.	..		*h*	1	..	..	13½d.	..		*q*

1	lb	@	3½d.	℔	ounce	*a*	3	lb	@	5½d.	℔	ounce	*i*
1	..	..	7¼d.	..		*b*	4	..	..	7¾d.	..		*k*
1	..	..	6¾d.	..		*c*	5	..	..	4½d.	..		*l*
1	..	..	5½d.	..		*d*	7	..	..	8¾d.	..		*m*
1	..	..	8¾d.	..		*e*	6	..	..	4¼d.	..		*n*
1	..	..	4d.	..		*f*	9	..	..	10½d.	..		*o*
1	..	..	9½d.	..		*g*	10	..	..	9½d.	..		*p*
1	..	..	10d.	..		*h*	2	..	..	15½d.	..		*q*

	£.	*s.*	*d.*		£.	*s.*	*d.*
a	0	3	0	*i*	0	10	0
b	0	2	0	*k*	0	14	0
c	0	4	0	*l*	0	15	0
d	0	6	0	*m*	0	16	4
e	0	7	0	*n*	1	0	0
f	0	9	0	*o*	1	7	4
g	0	5	0	*p*	1	12	0
h	0	11	0	*q*	0	18	0

	£.	*s.*	*d.*		£.	*s.*	*d.*
a	0	4	4	*i*	1	2	0
b	0	9	8	*k*	2	0	0
c	0	8	8	*l*	1	10	0
d	0	7	4	*m*	3	19	4
e	0	11	4	*n*	1	18	0
f	0	5	4	*o*	6	6	0
g	0	12	8	*p*	6	6	8
h	0	13	4	*q*	2	1	4

54.—To find the value of one lb. when the price of one cwt. is given.

Rule.—Divide the price of 1 cwt. by $2\frac{1}{2}$, and you will have the value of 1 lb. in farthings.

Demonstration.—$112 \div 2\frac{1}{2} = 48$; and taking shillings as farthings is equal to dividing by 48, because 48 farthings make one shilling.

Note. To divide by $2\frac{1}{2}$ it must be reduced to its improper fraction $\frac{5}{2}$, then multiply by 3, and divide by 7; divide first when you can. (28)

Example.—One lb. at £2. 6s. 8d. per cwt.; £2. 6s. 8d. × 3 = 140s.; then 140 qrs. ÷ 7 = 20 qrs. = 5d. *Ans.*

1	lb	@	14s.	℔ cwt.	*a*	1	lb.	@	105s.	0d.	℔ lb.	*i*
1	..	..	56s.	..	*b*	1	..	..	65s.	4d.	..	*k*
1	..	..	49s.	..	*c*	1	..	..	98s.	0d.	..	*l*
1	..	..	35s.	..	*d*	1	..	..	93s.	4d.	..	*m*
1	..	..	63s.	..	*e*	1	..	..	11s.	8d.	..	*n*
1	..	..	21s.	..	*f*	1	..	..	37s.	6d.	..	*o*
1	..	..	77s.	..	*g*	1	..	..	72s.	4d.	..	*p*
1	..	..	84s.	..	*h*	1	..	..	25s.	8d.	..	*q*

1	lb.	@	36s.	4d.	℔ cwt.	*a*	5	lbs.	@	67s.	8d.	℔ cwt.	*i*
1	..		78s.	6d.	..	*b*	7	..		84s.	0d.	..	*k*
1	..		73s.	8d.	..	*c*	8	..		58s.	6d.	..	*l*
1	..		65s.	8d.	..	*d*	4	..		49s.	0d.	..	*m*
1	..		33s.	8d.	..	*e*	8	..		79s.	6d.	..	*n*
1	..		108s.	6d.	..	*f*	6	..		38s.	8d.	..	*o*
1	..		146s.	4d.	..	*g*	9	..		106s.	8d.	..	*p*
1	..		166s.	8d.	..	*h*	11	..		58s.	4d.	..	*q*

	£.	s.	d.
a	0	0	$1\frac{1}{2}$
b	0	0	6
c	0	0	$5\frac{1}{4}$
d	0	0	$3\frac{3}{4}$
e	0	0	$6\frac{3}{4}$
f	0	0	$2\frac{1}{4}$
g	0	0	$8\frac{1}{4}$
h	0	0	9

	£.	s.	d.
i	0	0	$11\frac{1}{2}$
k	0	0	7
l	0	0	$10\frac{1}{2}$
m	0	0	10
n	0	0	$1\frac{1}{4}$
o	0	0	4
p	0	0	$7\frac{3}{4}$
q	0	0	$\frac{3}{4}$

	£.	s.	d.
a	0	0	$3\frac{3}{4}$
b	0	0	$8\frac{1}{4}$
c	0	0	$7\frac{3}{4}$
d	0	0	7
e	0	0	$3\frac{1}{4}$
f	0	0	$11\frac{1}{2}$
g	0	1	$3\frac{1}{2}$
h	0	1	$5\frac{1}{4}$

	£.	s.	d.
i	0	3	$0\frac{1}{4}$
k	0	5	3
l	0	4	2
m	0	1	9
n	0	5	8
o	0	2	$0\frac{3}{4}$
p	0	8	$6\frac{3}{4}$
q	0	5	$8\frac{3}{4}$

55.—To find the value of a ton, the price of a lb. being given. (Appendix, No. 8.)

RULE.—Take farthings as pounds, and multiply by $2\frac{1}{3}$.

Demonstration.—Taking farthings as pounds is equal to multiplying by 960, and $960 \times 2 + 320$ ($\frac{1}{3}$ of 960); $= 2240$, the number of pounds in one ton.

Example.—One ton at 4d. per lb.; 4d. $=$ 16 qrs. and $16 \times 2 +$ £5. 6s. 8d. ($\frac{1}{3}$ of £16.) $=$ £37. 6s. 8d. *Ans.*

1	ton	@	$\frac{1}{4}$d.	℔	lb.	*a*	1	ton	@	3d.	℔ lb	*i*
1	..	..	$1\frac{1}{2}$d.	..		*b*	1	..	..	4d.	..	*k*
1	..	..	$6\frac{1}{4}$d.	..		*c*	1	..	..	6d.	..	*l*
1	..	..	$4\frac{1}{2}$d.	..		*d*	1	..	..	8d.	..	*m*
1	..	..	$3\frac{1}{4}$d.	..		*e*	1	..	..	7d.	..	*n*
1	..	..	$9\frac{3}{4}$d.	..		*f*	1	..	..	$4\frac{1}{4}$d.	..	*o*
1	..	..	$8\frac{1}{4}$d.	..		*g*	1	..	..	5d.	..	*p*
1	..	..	$10\frac{1}{2}$d.	..		*h*	1	..	..	9d.	..	*q*

1	ton	@	$2\frac{1}{4}$d.	℔	lb	*a*	2	tons	@	1s.	$\frac{1}{4}$d.	℔ lb	*i*
1	..	..	$8\frac{1}{2}$d.	..		*b*	3	..	..	1s.	$3\frac{1}{4}$d.	..	*k*
1	..	..	$6\frac{1}{4}$d.	..		*c*	5	..	..		$6\frac{1}{2}$d.	..	*l*
1	..	..	$5\frac{1}{4}$d.	..		*d*	4	..	..	1s.	$1\frac{1}{4}$d.	..	*m*
1	..	..	$5\frac{3}{4}$d.	..		*e*	6	..	..		$3\frac{1}{2}$d.	..	*n*
1	..	..	$11\frac{1}{4}$d.	..		*f*	3	..	..		$5\frac{1}{4}$d.	..	*o*
1	..	..	$12\frac{3}{4}$d.	..		*g*	5	..	..	1s.	$10\frac{1}{4}$d.	..	*p*
1	..	..	$6\frac{1}{2}$d.	..		*h*	9	..	..	5s.		..	*q*

	£.	s.	d.		£.	s.	d.		£.	s.	d.		£.	s.	d.
a	7	0	0	*i*	28	0	0	*a*	28	6	8	*i*	238	7	0
b	14	0	0	*k*	37	6	8	*b*	79	6	8	*k*	427	0	0
c	68	0	0	*l*	56	0	0	*c*	58	6	8	*l*	303	6	8
d	42	0	0	*m*	74	13	4	*d*	49	0	0	*m*	494	13	4
e	35	0	0	*n*	65	6	8	*e*	56	13	4	*n*	210	0	0
f	91	0	0	*o*	29	13	4	*f*	105	0	0	*o*	161	0	0
g	77	0	0	*p*	46	13	4	*g*	119	0	0	*p*	1038	6	8
h	98	0	0	*q*	84	0	0	*h*	60	13	4	*q*	5040	0	0

56.—To find the value of one pound when the price of one ton is given.

RULE.—Divide the price of one ton in pounds by $2\frac{1}{3}$, and you will have the value of one pound in farthings.

Demonstration.—2240 (55) $\div 2\frac{1}{3} = 960$; and taking pounds as farthings is equal to dividing by 960, because 960 farthings make £1.

Note: To divide by $2\frac{1}{3}$ it must be reduced to its improper fraction, $\frac{7}{3}$, then multiply by 3, and divide by 7. (28) Divide first when you can.

Example.—1 lb. at £70. ℔ ton; $70 \div 7 = 10$, then 10 qrs. $\times 3 = 30$ qrs. $= 7\frac{1}{2}$d.

			£.	s.	d.					£.	s.	d.		
1	lb.	@	£14.			℔ ton	*a*	1	lb.	@	105	0	0	℔ ton	*i*
1	..		£56.			..	*b*	1	..		65	6	8	..	*k*
1	..		£49.			..	*c*	1	..		96	0	0	..	*l*
1	..		£35			..	*d*	1	..		93	6	8	..	*m*
1	..		£63.			..	*e*	1	..		11	13	4	..	*n*
1	..		£21.			..	*f*	1	..		37	10	0	..	*o*
1	..		£77.			..	*g*	1	..		72	6	8	..	*p*
1	..		£84.			..	*h*	1	..		46	13	4	..	*q*

			£.	s.	d.					£.	s.	d.		
1	lb.	@	36	6	8	℔ ton	*a*	5	lbs.	@	67	13	4	℔ ton	*i*
1	..		78	10	0	..	*b*	7	..		84	0	0	..	*k*
1	..		73	13	4	..	*c*	8	..		58	10	0	..	*l*
1	..		65	13	4	..	*d*	4	..		49	0	0	..	*m*
1	..		33	13	4	..	*e*	8	..		79	10	0	..	*n*
1	..		108	10	0	..	*f*	6	..		38	13	4	..	*o*
1	..		146	6	8	..	*g*	9	..		108	13	4	..	*p*
1	..		166	13	4	..	*h*	9	..		58	6	8	..	*q*

	£.	s.	d.		£.	s.	d.		£.	s.	d.		£.	s.	d.
a	0	0	$1\frac{1}{2}$	*i*	0	0	$11\frac{1}{2}$	*a*	0	0	$3\frac{3}{4}$	*i*	0	2	$0\frac{1}{4}$
b	0	0	6	*k*	0	0	7	*b*	0	0	$8\frac{1}{4}$	*k*	0	5	3
c	0	0	$5\frac{1}{4}$	*l*	0	0	$10\frac{1}{2}$	*c*	0	0	$7\frac{1}{2}$	*l*	0	4	2
d	0	0	$3\frac{3}{4}$	*m*	0	0	10	*d*	0	0	7	*m*	0	1	9
e	0	0	$6\frac{3}{4}$	*n*	0	0	$1\frac{1}{4}$	*e*	0	0	$3\frac{1}{4}$	*n*	0	5	8
f	0	0	$2\frac{1}{4}$	*o*	0	0	4	*f*	0	0	$11\frac{1}{2}$	*o*	0	2	$0\frac{1}{2}$
g	0	0	$8\frac{1}{4}$	*p*	0	0	$7\frac{1}{2}$	*g*	0	1	$3\frac{1}{4}$	*p*	0	8	$8\frac{1}{2}$
h	0	0	9	*q*	0	0	5	*h*	0	1	$5\frac{1}{2}$	*q*	0	4	$8\frac{1}{4}$

SECTION 5.—RULES RELATING TO TIME.

57.—To find what any number of pence per week will amount to in one year.

RULE.—Take 4 times as many shillings, and 4 times as many pence as there are pence per week, if there are farthings in the rate, add 1s. 1d. for each farthing.

Demonstration.—One penny per week, for 52 weeks, (the number of weeks in one year), will be 4s. 4d. consequently as many pence as there are per week, there will be 4 times as many shillings and 4 times as many pence for one year.

Example.—One year, at 10d. per week; $4 \times 10 = 40$, then 40s. and 40d. equal to £2. 3s. 4d. *Ans.*

1	year	@	4d.	℔ week	*a*	1	year	@	3d.	℔ week	*i*
1	..	..	8d.	..	*b*	1	..	..	7d.	..	*k*
1	..	..	6d.	..	*c*	1	..	..	5d.	..	*l*
1	..	..	12d.	..	*d*	1	..	..	11d.	..	*m*
1	..	..	10d.	..	*e*	1	..	..	9d.	..	*n*
1	..	..	2d.	..	*f*	1	..	..	15d.	..	*o*
1	..	..	14d.	..	*g*	1	..	..	13d.	..	*p*
1	..	..	16d.	..	*h*	1	..	..	17d.	..	*q*

1	year	@	2½d.	℔ week	*a*	2	years	@	6d.	℔ week	*i*
1	..	..	3½d.	..	*b*	4	..	..	17d.	..	*k*
1	..	..	4½d.	..	*c*	3	..	..	8½d.	..	*l*
1	..	..	6½d.	..	*d*	5	..	..	11½d.	..	*m*
1	..	..	9½d.	..	*e*	5	..	..	16½d.	..	*n*
1	..	..	8½d.	..	*f*	6	..	..	11½d.	..	*o*
1	..	..	5½d.	..	*g*	7	..	..	9½d.	..	*p*
1	..	..	7½d.	..	*h*	10	..	..	10½d.	..	*q*

	£.	s.	d.		£.	s.	d.		£.	s.	d.		£.	s.	d.
a	0	17	4	*i*	0	13	0	*a*	0	9	9	*i*	2	12	0
b	1	14	8	*k*	1	10	4	*b*	0	15	2	*k*	14	14	8
c	1	6	0	*l*	1	1	8	*c*	0	19	6	*l*	5	7	3
d	2	12	0	*m*	2	7	8	*d*	1	9	3	*m*	12	9	2
e	2	3	4	*n*	1	19	0	*e*	2	0	1	*n*	17	17	6
f	0	8	8	*o*	3	5	0	*f*	1	16	10	*o*	15	5	6
g	3	0	8	*p*	2	16	4	*g*	1	3	10	*p*	14	8	2
h	3	9	4	*q*	3	13	8	*h*	1	13	7	*q*	22	15	0

58.—To find what any number of shillings per week will amount to in one year.

RULE.—Take twice and a half as many pounds, and twice as many shillings as there are shillings per week.

Demonstration.—Fifty-two, the number of weeks in one year, is equal to twice 20, half of 20, and 2.

Example.—8s. per week, what a year? Twice and a half of 8 is equal to £20: and twice 8s. equal 16s. £20. 16s. *Ans.*

1	year	@	4s.	℔	week	*a*	1	year	@	3s.	℔	week	*i*
1	..	..	2s.	..		*b*	1	..	..	5s.	..		*k*
1	..	..	6s.	..		*c*	1	..	..	13s.	..		*l*
1	..	..	8s.	..		*d*	1	..	..	11s.	..		*m*
1	..	..	10s.	..		*e*	1	..	..	15s.	..		*n*
1	..	..	16s.	..		*f*	1	..	..	9s.	..		*o*
1	..	..	18s.	..		*g*	1	..	..	7s.	..		*p*
1	..	..	12s.	..		*h*	1	..	..	17s.	..		*q*

1	year	@	20s.	℔	week	*a*	2	years	@	7s.	℔	week	*i*
1	..	..	24s.	..		*b*	3	..	..	8s.	..		*k*
1	..	..	21s.	..		*c*	4	..	..	15s.	..		*l*
1	..	..	25s.	..		*d*	5	..	..	16s.	..		*m*
1	..	..	33s.	..		*e*	4	..	..	25s.	..		*n*
1	..	..	34s.	..		*f*	6	..	..	11s.	..		*o*
1	..	..	43s.	..		*g*	7	..	..	18s.	..		*p*
1	..	..	52s.	..		*h*	8	..	..	14s.	..		*q*

	£.	s.	d.		£.	s.	d.
a	10	8	0	*i*	7	16	0
b	5	4	0	*k*	13	0	0
c	15	12	0	*l*	33	16	0
d	20	16	0	*m*	28	12	0
e	26	0	0	*n*	39	0	0
f	41	12	0	*o*	23	8	0
g	46	16	0	*p*	18	4	0
h	31	4	0	*q*	44	4	0

	£.	s.	d.		£.	s.	d.
a	52	0	0	*i*	36	8	0
b	62	8	0	*k*	62	8	0
c	54	12	0	*l*	156	0	0
d	65	0	0	*m*	208	0	0
e	85	16	0	*n*	260	0	0
f	88	8	0	*o*	171	12	0
g	111	16	0	*p*	337	12	0
h	135	4	0	*q*	291	4	0

59.—To find what any number of pence per day will amount to in one year.

RULE.—Multiply the amount at 1d. per day by the number of pence.

Example and Demonstration.—5d. per day, what a year? 1d. per day = £1. 10s. 5d.; then £1. 10s. 5d. × 5 = £7. 12s. 1d. *Ans.* 5d. per day, for a year, omitting Sundays; 1d. per day = £1. 6s. 1d.; then £1. 6s. 1d. × 5 = £6. 10s. 5d. When farthings occur, find for the pence first, and add their amount to that sum.

Note. One farthing per day will amount to 7s. 7¼d.; ½d. to 15s. 2½d.; ¾d. to £1. 2s. 9¼d. per year; omitting Sundays, it will be 6s. 6¼d.; 13s. 0½d.; 19s. 6¾d.

With Sundays.					*Omitting Sundays.*				
3d.	℔	day	for 1	year	*a*	8d.	℔	day	for 1 year	*i*
7d.	..	..	....		*b*	5d.	..	..	....	*k*
4d.	..	..	....		*c*	4d.	..	..	....	*l*
10d.	..	..	....		*d*	7d.	..	..	....	*m*
8d.	..	..	....		*e*	8d.	..	..	....	*n*
9d.	..	..	....		*f*	10d.	..	..	....	*o*
11d.	..	..	....		*g*	9d.	..	..	....	*p*
5d.	..	..	....		*h*	11d.	..	..	....	*q*

2¼d.	℔	day	for 1	year	*a*	3½d.	℔	day	for 1	year *i*
4½d.	..	..	....		*b*	6¾d.	..	..	....	*k*
6¾d.	..	..	....		*c*	5½d.	..	..	....	*l*
7½d.	..	..	....		*d*	4¼d.	..	..	....	*m*
5¼d.	..	.	....		*e*	8¼d.	..	..	for 3	years *n*
9d.	..	..	for 2	years	*f*	9¾d.	..	..	for 6	years *o*
10½d.	..	..	for 4	years	*g*	2¼d.	..	..	for 7	years *p*
8¾d.	..	..	for 6	years	*h*	10¾d.	..	..	for 5	years *q*

	£.	*s.*	*d.*		£.	*s.*	*d.*		£.	*s.*	*d.*		£.	*s.*	*d.*
a	4	11	3	*i*	3	18	3	*a*	3	8	5½	*i*	4	11	3¼
b	10	12	11	*k*	6	10	5	*b*	6	16	10½	*k*	8	3	0¼
c	6	1	8	*l*	5	4	4	*c*	10	5	3¾	*l*	7	3	5¼
d	15	4	2	*m*	9	2	7	*d*	11	8	1¼	*m*	8	3	10¾
e	12	3	4	*n*	10	8	8	*e*	8	14	10¾	*n*	33	5	1¼
f	13	13	9	*o*	13	0	10	*f*	27	7	6	*o*	72	7	7½
g	16	14	7	*p*	11	14	9	*g*	63	17	6	*p*	25	2	1¾
h	7	12	1	*q*	14	16	11	*h*	79	16	10½	*q*	66	16	9¾

58.—To find what any number of shillings per week will amount to in one year.

RULE.—Take twice and a half as many pounds, and twice as many shillings as there are shillings per week.

Demonstration.—Fifty-two, the number of weeks in one year, is equal to twice 20, half of 20, and 2.

Example.—8s. per week, what a year? Twice and a half of 8 is equal to £20: and twice 8s. equal 16s. £20. 16s. *Ans.*

1	year	@	4s.	℔	week	*a*	1	year	@	3s.	℔ week *i*
1	..	..	2s.	..		*b*	1	..	..	5s.	.. *k*
1	..	..	6s.	..		*c*	1	..	..	13s.	.. *l*
1	..	..	8s.	..		*d*	1	..	..	11s.	.. *m*
1	..	..	10s.	..		*e*	1	..	..	15s.	.. *n*
1	..	..	16s.	..		*f*	1	..	..	9s.	.. *o*
1	..	..	18s.	..		*g*	1	..	..	7s.	.. *p*
1	..	..	12s.	..		*h*	1	..	..	17s.	.. *q*

1	year	@	20s.	℔	week	*a*	2	years	@	7s.	℔ week *i*
1	..	..	24s.	..		*b*	3	..	..	8s.	.. *k*
1	..	..	21s.	..		*c*	4	..	..	15s.	.. *l*
1	..	..	25s.	..		*d*	5	..	..	16s.	.. *m*
1	..	..	33s.	..		*e*	4	..	..	25s.	.. *n*
1	..	..	34s.	..		*f*	6	..	..	11s.	.. *o*
1	..	..	43s.	..		*g*	7	..	..	18s.	.. *p*
1	..	..	52s.	..		*h*	8	..	..	14s.	.. *q*

	£.	s.	d.		£.	s.	d.		£.	s.	d.		£.	s.	d.
a	10	8	0	*i*	7	16	0	*a*	52	0	0	*i*	36	8	0
b	5	4	0	*k*	13	0	0	*b*	62	8	0	*k*	62	8	0
c	15	12	0	*l*	33	16	0	*c*	54	12	0	*l*	156	0	0
d	20	16	0	*m*	28	12	0	*d*	65	0	0	*m*	208	0	0
e	26	0	0	*n*	39	0	0	*e*	85	16	0	*n*	260	0	0
f	41	12	0	*o*	23	8	0	*f*	88	8	0	*o*	171	12	0
g	46	16	0	*p*	18	4	0	*g*	111	16	0	*p*	337	12	0
h	31	4	0	*q*	44	4	0	*h*	135	4	0	*q*	291	4	0

59.—To find what any number of pence per day will amount to in one year.

RULE.—Multiply the amount at 1d. per day by the number of pence.

Example and Demonstration.—5d. per day, what a year? 1d. per day = £1. 10s. 5d.; then £1. 10s. 5d. × 5 = £7. 12s. 1d. *Ans.* 5d. per day, for a year, omitting Sundays; 1d. per day = £1. 6s. 1d.; then £1. 6s. 1d. × 5 = £6. 10s. 5d. When farthings occur, find for the pence first, and add their amount to that sum.

Note. One farthing per day will amount to 7s. 7¼d.; ½d. to 15s. 2½d.; ¼d. to £1. 2s. 9½d. per year; omitting Sundays, it will be 6s. 6¼d.; 13s. 0½d.; 19s. 6¼d.

With Sundays.		*Omitting Sundays.*	
3d.	per day for 1 year	*a*	8d. per day for 1 year	*i*
7d.	.. ..	*b*	5d.	*k*
4d.	.. ..	*c*	4d.	*l*
10d.	.. ..	*d*	7d.	*m*
8d.	.. ..	*e*	8d.	*n*
9d.	.. ..	*f*	10d.	*o*
11d.	.. ..	*g*	9d.	*p*
5d.	.. ..	*h*	11d.	*q*

2¼d.	per day for 1 year	*a*	3¼d.	per day for 1 year	*i*
4½d.	.. ..	*b*	6¼d.	.. ..	*k*
6¾d.	.. ..	*c*	5¼d.	.. ..	*l*
7½d.	.. ..	*d*	4¼d.	.. ..	*m*
5¼d.	.. ..	*e*	8¼d.	.. .. for 3 years	*n*
9d.	.. .. for 2 years	*f*	9¼d.	.. .. for 6 years	*o*
10½d.	.. .. for 4 years	*g*	2¼d.	.. .. for 7 years	*p*
8¼d.	.. .. for 6 years	*h*	10¼d.	.. .. for 5 years	*q*

	£. s. d.		£. s. d.
a	4 11 3	*i*	3 18 3
b	10 12 11	*k*	6 10 5
c	6 1 8	*l*	5 4 4
d	15 4 2	*m*	9 2 7
e	12 3 4	*n*	10 8 8
f	13 13 9	*o*	13 0 10
g	16 14 7	*p*	11 14 9
h	7 12 1	*q*	14 16 11

	£. s. d.		£. s. d.
a	3 8 5½	*i*	4 11 3½
b	6 16 10½	*k*	8 3 0½
c	10 5 3½	*l*	7 3 5½
d	11 8 1½	*m*	6 3 10½
e	8 14 10½	*n*	33 5 1½
f	27 7 6	*o*	72 7 7½
g	63 17 6	*p*	25 2 1½
h	29 16 10½	*q*	66 16 9½

60.—To find what any number of shillings per day will amount to in one year.

RULE.—Multiply the amount at 1s. per day by the number of shillings; when pence occur, find for them separately, and add.

Example and Demonstration.—3s. per day, what a year? 1s. ℔ day = £18. 5s. and £18. 5s. × 3 = £54. 15s. *Ans.* 5s. per day, what a year, omitting Sundays? 1s. ℔ day = £15. 13s. and £15. 13s. × 5 = £78. 5s. *Ans.*

With Sundays.				*Omitting Sundays.*			
2s.	℔	day for 1 year	*a*	3s.	℔	day for 1 year	*i*
4s.	....	....	*b*	5s.	....	....	*k*
5s.	....	....	*c*	6s.	....	....	*l*
3s.	....	....	*d*	8s.	....	....	*m*
7s.	....	....	*e*	4s.	....	....	*n*
8s.	....	....	*f*	7s.	....	....	*o*
14s.	....	....	*g*	9s.	....	....	*p*
10s.	....	....	*h*	10s.	....	....	*q*

4s.	6d.	℔ day for 1 year	*a*	4s.	6d.	℔ day for 1 year	*i*
3s.	4d.	....	*b*	3s.	4d.	....	*k*
2s.	8d.	....	*c*	2s.	8d.	....	*l*
10s.	6d.	....	*d*	10s.	6d.	....	*m*
6s.	3d.	.... for 3 years	*e*	6s.	3d.	.... for 5 years	*n*
7s.	5d.	.... for 4 years	*f*	7s.	5d.	.... for 6 years	*o*
5s.	6d.	.... for 8 years	*g*	5s.	6d.	.... for 4 years	*p*
8s.	2d.	.... for 3 years	*h*	8s.	2d.	.... for 2 years	*q*

	£.	*s.*	*d.*		£.	*s.*	*d.*		£.	*s.*	*d.*		£.	*s.*	*d.*
a	36	10	0	*i*	46	19	0	*a*	82	2	6	*i*	70	8	6
b	73	0	0	*k*	78	5	0	*b*	60	16	8	*k*	52	3	4
c	91	5	0	*l*	98	18	0	*c*	48	13	4	*l*	41	14	8
d	54	15	0	*m*	125	4	0	*d*	191	12	6	*m*	164	6	6
e	127	15	0	*n*	62	12	0	*e*	342	3	9	*n*	489	1	3
f	146	0	0	*o*	109	11	0	*f*	541	8	4	*o*	698	8	6
g	255	10	0	*p*	140	17	0	*g*	803	0	0	*p*	344	6	0
h	189	10	0	*q*	186	10	0	*h*	447	2	6	*q*	255	12	4

SECTION 6.—GENERAL RULES.

61.—To find the value of any number of articles, at any number of pence per lb. yard, oz. &c.

RULE.—Find the value at one penny, and multiply by the number of pence. (Appendix, No. 6.)

Demonstration and Example.—55 yards of calico, at 5d. per yard. 55 yards at 1d. = 4s. 7d.; 4s. 7d. × 5 = £1. 2s. 11d. *Ans.*

Note. Always take the nearest standard number, and add or subtract accordingly, as 717 yards, at 4d. per yard; borrow 3 then 720d. = £3. £3. × 4 = £12.; then 3d. × 4 = 1s. taken from £12. = £11. 19s. *Ans.*

54	yards	@	6d.	℔ yard	*a*	124	yards	@	4d.	℔ yard	*i*
76	..	..	8d.	..	*b*	136	..	..	5d.	..	*k*
99	..	..	4d.	..	*c*	160	..	..	6d.	..	*l*
86	..	..	7d.	..	*d*	156	..	..	8d.	..	*m*
46	..	..	10d.	..	*e*	110	..	..	7d.	..	*n*
39	..	..	11d.	..	*f*	113	..	..	6d.	..	*o*
74	..	..	8d.	..	*g*	130	..	..	4d.	.	*p*
58	..	..	7d.	..	*h*	140	..	..	5d.	..	*q*

66½	lbs.	@	8d.	℔ lb.	*a*	724½	ounces	@	6d.	℔ oz.	*i*
78¼	..	..	6d.	..	*b*	966½	..	..	4d.	..	*k*
126¼	..	..	10d.	..	*c*	1220½	..	..	6d.	..	*l*
146½	..	..	8d.	..	*d*	1566	..	..	8d.	..	*m*
172½	..	..	4d.	..	*e*	1704½	..	..	4d.	..	*n*
59¼	..	..	8d.	..	*f*	252½	..	..	6d.	..	*o*
47¼	..	..	9d.	..	*g*	428½	..	..	4d.	..	*p*
39¼	..	..	11d.	..	*h*	8474½	..	..	3d.	..	*q*

	£.	s.	d.		£.	s.	d.		£.	s.	d.		£.	s.	d.
a	1	7	0	*i*	2	1	4	*a*	2	4	4	*i*	18	2	3
b	2	16	8	*k*	2	16	8	*b*	1	19	1½	*k*	16	2	2
c	1	13	0	*l*	4	0	0	*c*	3	5	7½	*l*	30	10	3
d	2	10	2	*m*	5	4	0	*d*	4	17	8	*m*	52	4	0
e	1	18	4	*n*	3	4	2	*e*	2	17	6	*n*	28	8	2
f	1	15	9	*o*	2	16	6	*f*	1	19	10	*o*	6	6	3
g	2	9	4	*p*	2	3	4	*g*	1	15	5½	*p*	7	2	10
h	1	13	10	*q*	2	18	4	*h*	1	16	5½	*q*	105	18	7½

62.—To find the value of any number of articles and quarters, at any number of pence and farthings each.

RULE.—Find the value at 1d. and multiply by the number of pence; if ¼d. occur, take ¼; if ½d. take ½; if ¾d. take ¾ of what it comes to at 1d.

Demonstration and Example.—39¾ yards, at 4¾d. per yard; 39¾ at 1d. = 3s. 3¾d.; 3s. 3¾d. × 4 = 13s. 3d.; ¾ of 3s. 3¾d. = 2s. 5¾d.; then 13s. 3d. + 2s. 5¾d. = 15s. 8¾d. *Ans.*

42½	yards @	3½d. ℔ yd.	*a*	138½	ounces @	10½d. ℔ oz.	*i*
38¼	..	6¼d. ..	*b*	148¼	..	6¼d. ..	*k*
76¼	..	8¾d. ..	*c*	29¾	..	9¾d. ..	*l*
88¼	..	5¾d. ..	*d*	71¾	..	10¾d. ..	*m*
68¾	..	4¼d. ..	*e*	79¼	..	4¾d. ..	*n*
99¼	..	9¼d. ..	*f*	129¾	..	4¼d. ..	*o*
102¼	..	7¾d. ..	*g*	148½	..	10¾d. ..	*p*
126½	..	10¾d. ..	*h*	140¾	..	12¾d. ..	*q*

239¾	lbs. @	9¾d. ℔ lb.	*a*	782½	articles @	6¾d. each	*i*
354¼	..	7¾d. ..	*b*	824¼	.. ..	4¼d. ..	*k*
714¼	..	8¼d. ..	*c*	984¾	.. ..	5¼d. ..	*l*
559¼	..	4¼d. ..	*d*	1178¼	.. ..	4¼d. ..	*m*
348½	..	3¼d. ..	*e*	1684¼	.. ..	7¾d. ..	*n*
497¾	..	11¾d. ..	*f*	1866¼	.. ..	10¼d. ..	*o*
1439¼	..	5¾d. ..	*g*	1984¾	.. ..	8¼d. ..	*p*
1644¼	..	7¼d. ..	*h*	1932¼	.. ..	3¾d. ..	*q*

	£.	s.	d.		£.	s.	d.		£.	s.	d.		£.	s.	d.
a	0	12	4¾	*i*	6	1	2¼	*a*	9	4	9¼	*i*	~~21 12 10½~~		
b	1	0	8¼	*k*	3	17	2¼	*b*	11	1	6¾	*k*	14	11	11
c	2	15	7	*l*	1	4	1¾	*c*	25	5	11	*l*	22	11	4
d	2	2	3¼	*m*	3	1	3¾	*d*	10	9	8¼	*m*	22	~~[illegible]~~	
e	1	5	8¼	*n*	1	11	5¼	*e*	5	8	10¾	*n*	54	7	10¾
f	3	16	6	*o*	2	5	11¼	*f*	24	7	4¼	*o*	79	14	3¼
g	3	4	0¾	*p*	6	13	0¼	*g*	31	9	9¼	*p*	70	5	10¼
h	5	10	8¼	*q*	7	3	8	*h*	51	7	7¾	*q*	39	3	~~11~~

63.—To find what any number of articles will amount to when the price is a fractional part of a shilling or a pound.

RULE.—Divide by the denominator, and multiply by the numerator.

Demonstration.—Any given number of articles, at 1s. or £1. each, will amount to the same number of shillings or pounds, consequently, the value of any given number of articles, at any fraction of 1s. or £1. each, will amount to the same fraction of the whole sum, in 1s. or £1.

Example.—342 yards, at 8d. per yard. 342 at 1s. = £17. 2s.; 8d. = $\frac{2}{3}$ of 1s. then £17. 2s. ÷ 3 = £5. 14s. × 2 = £11. 8s. *Ans.*

81	yards	@	4d.	℔	yard	*a*	98	yds.	@	5s. 0d.	℔ yd. *i*
784	..		3d.	..		*b*	284	..		10s. 0d.	.. *k*
285	..		6d.	..		*c*	382	..		4s. 0d.	.. *l*
344	..		1½d.	..		*d*	784	..		2s. 6d.	.. *m*
864	..		4d.	..		*e*	986	..		3s. 4d.	.. *n*
746	..		1½d.	..		*f*	878	..		6s. 8d.	.. *o*
88	..		2d.	..		*g*	1658	..		5s. 0d.	.. *p*
628	..		3d.	..		*h*	1980	..		4s. 0d.	.. *q*

56	yards	@	7½d.	℔	yard	*a*	72	yds	@	13s. 4d.	℔ yd. *i*
382	..		4½d.	..		*b*	84	..		15s. 0d.	.. *k*
572	..		10½d.	..		*c*	482	..		12s. 0d.	.. *l*
384	..		7½d.	..		*d*	482	..		12s. 6d.	.. *m*
524	..		10½d.	..		*e*	724	..		6s. 8d.	.. *n*
322	..		4½d.	..		*f*	322	..		13s. 4d.	.. *o*
428	..		8d.	..		*g*	89	..		17s. 6d.	.. *p*
362	..		10d.	..		*h*	368	..		7s. 6d.	.. *q*

	£.	s.	d.
a	1	7	0
b	9	16	0
c	7	2	6
d	2	3	0
e	14	8	0
f	4	13	3
g	0	14	8
h	7	17	9

	£.	s.	d.
i	24	10	0
k	142	0	0
l	76	8	0
m	98	0	0
n	164	6	8
o	292	13	4
p	414	10	0
q	396	0	0

	£.	s.	d.
a	1	15	0
b	7	3	3
c	25	0	6
d	12	0	0
e	22	18	6
f	6	0	9
g	14	5	4
h	15	1	8

	£.	s.	d.
i	48	0	0
k	63	0	0
l	289	4	0
m	301	5	0
n	241	6	8
o	214	13	4
p	77	17	6
q	138	0	0

64.—To find the value of any number of articles and quarters, at any number of shillings, pence, and farthings each.

RULE.—Find for 1s. and multiply by the number of shillings, then find for the pence and farthings, and add.

Demonstration and Example.—Sixty-seven yards of blue cloth, at 7s. 7¼d. per yard; 67s. = £3. 7s.; £3. 7s. × 7 = £23. 9s. and 7¼d. = ¼ of 1s. then 67 ÷ 8 = 8s. 4¼d. × 5 = £2. 1s. 10¼d.; then £23. 9s. + £2. 1s. 10¼d. = £25. 10s. 10¼d. *Ans.*

57	yards	@	3s.	0d.	℔ yd.	*a*	168	yds.	@	9s.	0d. ℔ yd. *i*
86	..	..	6s.	0d.	..	*b*	126	..	..	10s.	6d. .. *k*
98	..	..	7s.	0d.	..	*c*	246	..	..	5s.	8d. .. *l*
108	..	.	9s.	0d.	..	*d*	479	..	..	8s.	7d. .. *m*
120	..	..	6s.	0d.	..	*e*	168	..	..	5s.	5d. .. *n*
144	..	..	9s.	0d.	..	*f*	192	..	..	8s.	6d. .. *o*
182	..	.	2s.	4d.	..	*g*	360	..	..	6s.	9d. .. *p*
186	..	..	8s.	0d.	..	*h*	726	..	..	10s.	10d. .. *q*

119	yds.	@	3s.	6¼d.	℔ yd.	*a*	288	yds.	@	1s.	7¼d. ℔ yd. *i*
92	..	..	3s.	4¼d.	..	*b*	216	..	..	3s.	7¼d. .. *k*
78½	..	..	3s.	9½d.	..	*c*	302	..	..	5s.	5d. .. *l*
83¼	..	..	10s.	8d.	..	*d*	609	..	..	5s.	11d. .. *m*
171	..	..	8s.	8½d.	..	*e*	1441	..	..	3s.	5d. .. *n*
156	..	..	7s.	6¼d.	..	*f*	1692	..	..	1s.	11d. .. *o*
1253	..	..	4s.	1d.	..	*g*	4085	..	..	6s.	7d. .. *p*
787	..	..	2s.	6d.	..	*h*	4815	..	..	10s.	4½d. .. *q*

	£.	s.	d.		£.	s.	d.		£.	s.	d.		£.	s.	d.
a	8	11	0	*i*	75	12	0	*a*	21	1	5½	*i*	23	8	0
b	25	16	0	*k*	66	3	0	*b*	15	8	7	*k*	39	3	0
c	34	6	0	*l*	69	14	0	*c*	14	17	7¾	*l*	81	15	10
d	48	12	0	*m*	205	11	5	*d*	44	13	4	*m*	180	3	3
e	36	0	0	*n*	45	10	0	*e*	74	9	1½	*n*	246	3	5
f	64	16	0	*o*	81	12	0	*f*	58	16	6	*o*	162	3	0
g	21	4	8	*p*	121	10	0	*g*	255	16	5	*p*	1344	12	11
h	74	8	0	*q*	393	5	0	*h*	98	7	6	*q*	2,97	15	7½

65.—To find the value of any number of articles when the number will make a certain number of dozens, scores, grosses, hundreds, &c. (43, 45, 47, 49.)

RULE.—Find for one dozen, score, gross, or hundred, &c. and multiply by the number of dozens, scores, grosses, hundreds, &c. When the question is not exactly any number of dozens, scores, grosses, or hundreds, find for the nearest, and add or subtract accordingly.

Example.—107 lbs. at 8¼d. per lb.; borrow 1, and it will be 9 dozen. One at 8¼d. will be 8s. 9d. per dozen (43); and 8s. 9d. × 9 = £3. 18s. 9d. − 8¼d. = £3. 18s. 0¼d. *Ans.*

36	yds.	@	0s.	9d.	℔ yd.	*a*	96	yds.	@	0s.	8d. ℔ yd. *i*
30	lbs.	@	0s.	5¼d.	℔ lb.	*b*	240	..		7s.	6d. .. *k*
66	..		0s.	10½d.	..	*c*	120	..		0s.	11d. .. *l*
79	..		3s.	4d.	..	*d*	700	..		0s.	9d. .. *m*
394	..		0s.	8¼d.	..	*e*	280	..		5s.	6d. .. *n*
144	..		0s.	9½d.	..	*f*	340	..		6s.	8d. .. *o*
350	..		5s.	6d.	..	*g*	999	..		0s.	11¼d. .. *p*
800	..		0s.	4½d.	..	*h*	788	..		0s.	6¾d. .. *q*

600	yds.	@	9s.	6d.	℔ yd.	*a*	71	lbs.	@	0s.	6¾d. ℔ lb. *i*
59	..		0s.	7¾d.	..	*b*	99	..		0s.	4¼d. .. *k*
117	..		0s.	11¼d.	..	*c*	141	..		8s.	6d. .. *l*
378	..		3s.	6d.	..	*d*	780	..		0s.	4¼d. .. *m*
459	..		7s.	8d.	..	*e*	1596	..		0s.	8d. .. *n*
1300	..		0s.	9d.	..	*f*	495	..		7s.	6d. .. *o*
742	..		0s.	8d.	..	*g*	135	..		1s.	3¾d. .. *p*
640	..		4s.	9d.	..	*h*	179	..		1s.	4¼d. .. *q*

	£.	s.	d.		£.	s.	d.
a	1	7	0	*i*	3	4	0
b	0	14	4½	*k*	90	0	6
c	2	17	9	*l*	5	10	0
d	13	3	4	*m*	26	5	0
e	21	0	9	*n*	77	0	0
f	5	14	0	*o*	113	6	8
g	96	5	0	*p*	47	17	4½
h	15	0	0	*q*	22	3	3

	£.	s.	d.		£.	s.	d.
a	285	0	0	*i*	1	18	5½
b	1	18	1½	*k*	1	19	2½
c	5	9	8½	*l*	59	18	6
d	66	3	0	*m*	14	12	6
e	175	19	0	*n*	53	4	0
f	48	15	0	*o*	185	12	6
g	24	14	8	*p*	8	14	4½
h	152	0	0	*q*	12	9	10½

SECTION 7.—INTEREST.

66.—Interest is money paid for the use of money, which is usually lent at a certain rate per cent. that is, at so much for the use of £100. for one year, or so many 100th parts of the principal, or money lent.

Hence, if the given sum be divided by 100, it will give one hundredth part, or one per cent. which sum, multiplied by the given rate per cent. will give the interest for one year.

Hence the following general RULE for finding the interest for one year. Multiply by the rate per cent. and divide by 100.

For any number of years, months, weeks, or days; find for one year, and say, as one year is to the given number of years, months, weeks, or days, so is the interest of one year to the interest for the time given. These are rules of universal application, but the working of them out takes many figures, and much time, which may be saved by the following RULES, in all cases where they will apply, and the questions to which they will not are not of very common occurrence, and must be calculated by the general rules.

The last three rules, for finding the interest of any sum of money, at any rate per cent. for years, months, and days, are not (to the Author's knowledge) to be found in any similar work; it was not until these pages were nearly ready for the press that they were discovered. By these, the interest of any sum, at any rate per cent. may be calculated for any time, so far as it is practicable to calculate mentally. Thus comprehending, in three short RULES, founded upon one general principle, (viz. 1 per cent. for £1.) more than is to be found in any other author, though some of them have devoted upwards of twenty rules, and above sixty pages to Interest alone.

67.—To find the interest or discount upon any sum of money, at 5 per cent. per annum.

RULE.—Reckon a shilling for every pound; if shillings occur, take the aliquot parts of 1s. that they are of £1.

Demonstration.—The interest of £100. at 5 per cent. is equal to £5. or 100s. If £100. will give 100s. £1. will give 1s.; and any fraction of £1. will give the same fraction of 1s.

Example.—£75. 6s. 8d. at 5 per cent.; £75. taken as shillings, is equal to £3. 15s. and 6s. 8d. equal $\frac{1}{3}$ of £1. will give 4d. $\frac{1}{3}$ of 1s. £3. 15s. 4d. *Ans.*

£.	s.	d.						£.	s.	d.					
12	0	0	@	5	℔	cent	*a*	47	0	0	@	5	℔	cent.	*i*
42	0	0	..	....			*b*	69	0	0	..	....			*k*
68	0	0	..	....			*c*	87	0	0	..	....			*l*
72	0	0	..	....			*d*	99	0	0	..	....			*m*
110	0	0	..	....			*e*	63	0	0	..	....			*n*
98	0	0	..	....			*f*	82	0	0	..	....			*o*
45	0	0	..	....			*g*	49	0	0	..	....			*p*
84	0	0	..	....			*h*	54	0	0	..	....			*q*

26	5	0	@	5	℔	cent.	*a*	234	6	8	@	5	℔	cent.	*i*
48	10	0	..	....			*b*	152	3	4	..	....			*k*
70	15	0	..	....			*c*	485	2	6	..	....			*l*
84	10	0	..	....			*d*	86	13	4	..	....			*m*
49	10	0	..	....			*e*	158	12	6	..	....			*n*
69	5	0	..	....			*f*	189	1	8	..	....			*o*
99	10	0	..	....			*g*	264	7	6	..	....			*p*
88	5	0	..	....			*h*	365	17	6	..	....			*q*

	£.	s.	d.		£.	s.	d.
a	0	12	0	*i*	2	7	0
b	2	2	0	*k*	3	9	0
c	3	8	0	*l*	4	7	0
d	3	12	0	*m*	4	19	0
e	5	10	0	*n*	3	3	0
f	4	18	0	*o*	4	2	0
g	2	5	0	*p*	2	9	0
h	4	4	0	*q*	2	14	0

	£.	s.	d.		£.	s.	d.
a	1	6	3	*i*	11	14	4
b	2	8	6	*k*	7	12	2
c	3	10	9	*l*	24	5	1½
d	4	4	6	*m*	4	6	8
e	2	9	6	*n*	7	18	7½
f	3	9	3	*o*	9	9	1
g	4	19	6	*p*	13	4	4½
h	4	8	3	*q*	18	5	10½

68.—To find the interest of any sum of money, at 5 per cent. for any number of months.

RULE.—Take the pounds as pence, and multiply by the months.

Demonstration.—The interest of £1, at 5 per cent. for 1 year, is 1s. (67) and 1s. or 12d. for 12 months will be 1d. for 1 month.

Example.—£480. 10s. at 5 per cent. for 5 months. £480. taken as pence is £2. and 10s. $\frac{1}{2}$ of £1. is equal to $\frac{1}{2}$d.; then £2. 0s. 0$\frac{1}{2}$d. × 5 = £10. 0s. 2$\frac{1}{2}$d. *Ans.*

£.	s.	d.	5 per cent.			£.	s.	d.	5 per cent.		
75	0	0	for 3	months	*a*	69	0	0	for 7	months	*i*
14	0	0	.. 7	..	*b*	99	0	0	.. 8	..	*k*
60	0	0	.. 6	..	*c*	104	0	0	.. 7	..	*l*
120	0	0	.. 8	..	*d*	488	0	0	.. 3	..	*m*
246	0	0	.. 3	..	*e*	598	0	0	.. 10	..	*n*
380	0	0	.. 6	..	*f*	806	0	0	.. 11	..	*o*
175	0	0	.. 6	..	*g*	738	0	0	.. 2	..	*p*
72	0	0	.. 9	..	*h*	520	0	0	.. 3	..	*q*

4	5	0	for 2	months	*a*	960	10	0	for 10	months	*i*
9	10	0	.. 3	..	*b*	650	5	0	.. 5	..	*k*
84	15	0	.. 4	..	*c*	1375	10	0	.. 8	..	*l*
108	10	0	.. 6	..	*d*	3656	10	0	.. 2	..	*m*
710	10	0	.. 3	..	*e*	5040	5	0	.. 5	..	*n*
120	10	0	.. 7	..	*f*	4250	15	0	.. 4	..	*o*
132	8	0	.. 8	..	*g*	6000	0	0	.. 6	..	*p*
144	9	0	.. 9	..	*h*	8466	0	0	.. 3	..	*q*

	£.	s.	d.		£.	s.	d.
a	0	18	9	*i*	2	0	3
b	0	8	2	*k*	3	6	0
c	1	10	0	*l*	3	0	8
d	4	0	0	*m*	6	2	0
e	3	1	6	*n*	24	18	4
f	9	10	0	*o*	36	18	10
g	4	7	6	*p*	6	3	0
h	2	14	0	*q*	6	10	0

	£.	s.	d.		£.	s.	d.
a	0	0	8½	*i*	40	0	5
b	0	2	4½	*k*	13	10	11½
c	1	8	3	*l*	45	17	0
d	2	14	3	*m*	30	9	5
e	3	17	7½	*n*	105	0	1½
f	3	10	3½	*o*	70	16	11
g	4	8	3	*p*	150	0	0
h	5	8	4	*q*	105	16	6

69.—To find the interest of any sum of money, for any number of days, at 5 per cent.

RULE.—Divide the product of the pounds and days by 30, and you will have the answer in pence, excepting that you must deduct 1d. for every 6s.

Demonstration.—The interest of £1. for 1 month, is 1d. (68); for 1 day it will be $\frac{1}{30}$ of 1d. because 30 days are reckoned to one month, but $30 \times 12 = 360$ which is 5 days, or $\frac{1}{72}$ short of 1 year, hence 1d. must be deducted for every 72d. or 6s.

Example.—£20. for 20 days. $20 \times 20 = 400$; $400 \div 30 = 13\frac{1}{3}$d. *Ans.*

Note. When either the pounds or days are divisible by 3, multiplying by $\frac{1}{3}$ of either, and cutting of the unit figure, is equal to multiplying by the whole number, and dividing by 30: because multiplying by $\frac{1}{3}$ is equal to dividing by 3, and cutting off the unit figure is equal to dividing by 10, and $10 \times 3 = 30$; the unit figures are 10ths of 1d.

£.	s.	d.	5 per cent.	
51	0	0	for 18 days	*a*
97	0	0	.. 15 ..	*b*
120	0	0	.. 9 ..	*c*
150	0	0	.. 21 ..	*d*
720	0	0	.. 30 ..	*e*

£.	s.	d.	5 per cent.	
1200	0	0	for 27 days	*f*
240	0	0	.. 11 ..	*g*
780	0	0	.. 21 ..	*h*
360	0	0	.. 18 ..	*i*
500	0	0	.. 24 ..	*k*

1080	0	0	for 27 days	*a*
2000	0	0	.. 24 ..	*b*
3000	0	0	.. 16 ..	*c*
51	0	0	.. 17 ..	*d*
45	0	0	.. 15 ..	*e*

	£.	s.	d.		£.	s.	d.	
a	0	2	6½	*f*	4	8	9	
b	0	4	0	*g*	0	7	3	
c	0	2	11½	*h*	2	4	10½	
d	0	8	7½	*i*	0	17	9	
e	2	19	2	*k*	1	12	9½	

	£.	s.	d.		£.	s.	d.	
a	3	19	10½	*f*	0	3	4	
b	6	11	6	*g*	0	2	11½	
c	6	11	6	*h*	0	9	12	
d	0	2	4½	*i*	1	9	6½	
e	0	1	10½	*k*	1	18	7½	

70.—To find the interest of any sum of money, for any number of years and months, at any rate per cent.

Rule.—Multiply by double the rate per cent. reject the unit figure, and you will have the interest for 1 one year, in shillings. The unit figures are 10ths of one shilling.

Demonstration.—The general rule is to multiply by the rate per cent. and divide by 100 (66). If you double the rate per cent. you must divide by 200, which is done by the rule, for taking pounds as shillings, is equal to dividing by 20, and cutting off the unit to 10, and $20 \times 10 = 200$.

Example.—£300. at $2\frac{1}{2}$ per cent. 300×5 ($2\frac{1}{2} \times 2$) $= 1500$, reject the unit, you will have 150, taken as shillings, £7. 10. *Proof*: £300. at 5 per cent. = £15.; £15. ÷ 2 = £7. 10s.

£.	s.	d.					
72	0	0	@	$2\frac{1}{2}$	℔ cent.		*a*
126	0	0	..	$3\frac{1}{2}$	..		*b*
243	0	0	..	$3\frac{1}{2}$	..		*c*
360	0	0	..	4	..		*d*
500	0	0	..	6	..		*e*
400	0	0	..	$1\frac{1}{2}$	..		*f*

£.	s.	d.					
700	0	0	@	6	℔ cent.		*g*
325	0	0	..	$2\frac{1}{2}$	..		*h*
282	0	0	..	$3\frac{1}{2}$	..		*i*
402	0	0	..	$4\frac{1}{2}$	..		*k*
500	0	0	..	$3\frac{1}{2}$	..		*l*
364	0	0	..	$4\frac{1}{2}$	..		*m*

£.	s.	d.					
824	0	0	@	3	℔ cent.		*a*
682	0	0	..	2	..		*b*
794	0	0	..	4	..		*c*
2282	0	0	..	3	..		*d*
842	0	0	..	$1\frac{1}{2}$	..		*e*
365	0	0	..	$6\frac{1}{2}$	..		*f*

£.	s.	d.	*per cent.*		Y.	M.	
600	0	0	@	$4\frac{1}{2}$ for	1	6	*g*
900	0	0	..	5 ..	5	9	*h*
1800	0	0	..	$2\frac{1}{2}$ ..	3	6	*i*
720	0	0	..	2 ..	4	6	*k*
760	0	0	.	$4\frac{1}{2}$ ..	2	3	*l*
1260	0	0	..	$3\frac{1}{2}$ ..	3	8	*m*

	£.	s.	d.		£.	s.	d.
a	1	16	0	*g*	42	0	0
b	4	8	2	*h*	8	2	6
c	8	10	1	*i*	9	17	$4\frac{1}{2}$
d	14	8	0	*k*	18	1	$9\frac{1}{2}$
e	30	0	0	*l*	17	10	0
f	6	0	0	*m*	16	7	7

	£.	s.	d.		£.	s.	d.
a	24	14	$4\frac{1}{2}$	*g*	40	10	0
b	13	12	$9\frac{1}{2}$	*h*	258	15	0
c	31	15	2	*i*	157	10	0
d	68	9	2	*k*	64	16	0
e	12	12	7	*l*	76	19	0
f	23	14	6	*m*	161	14	0

71.—To find the interest of any sum of money, at any rate per cent. for any number of years.

Rule.—Take the pounds as shillings, and multiply by the rate per cent. and the years, and divide by 5. If shillings occur, take the aliquot parts of a shilling that they are of a pound.

Note. Divide either of the factors first when you can.

Demonstration.—If 1 per cent is (66) £1. or 240d. for £100. it will be 2½d. for £1.; then, if any number of pounds be multiplied by 2½d. or its improper fraction, $\frac{5}{2}$ (25) it will give the interest at 1 per cent. in pence. But to take pence as shillings is equal to multiplying by 12; therefore, instead of reckoning the pounds as pence, reckon them as shillings, and divide by 5, and you will have the interest in shillings. This sum, multiplied by the given rate per cent. and the number of years, will give the required interest.

Example.—£90. at 4 per cent. 90 ÷ 5 = 18s.; and 18s. × 4 = £3. 12s. 0d. *Ans.*

£.						£.					
75	@	3	℔ cent. for	1 year	*a*	400	@	2	℔ cent. for	1 year	*f*
120	..	5	....	....	*b*	360	..	3	....	....	*g*
65	..	7	....	....	*c*	185	..	2	....	....	*h*
80	..	6	....	....	*d*	67	..	5	....	....	*i*
45	..	8	....	....	*e*	230	..	4	....	....	*k*

65	@	6	℔ cent. for	2	yrs. *a*	63	@	3	℔ cent. for	5	yrs. *f*
75	..	3	.....	5	.. *b*	82	..	4	.....	10	.. *g*
90	..	6	.....	3	.. *c*	54	..	6	.....	6	.. *h*
30	..	3	.....	6	.. *d*	220	..	3	.....	3	.. *i*
45	..	5	.....	8	.. *e*	340	..	4	.....	4	.. *k*

	£.	s.	d.		£.	s.	d.
a	2	5	0	*f*	8	0	0
b	6	0	0	*g*	10	16	0
c	4	11	0	*h*	3	14	0
d	4	16	0	*i*	3	7	0
e	3	12	0	*k*	9	4	0

	£.	s.	d.		£.	s.	d.
a	7	16	0	*f*	9	9	0
b	11	5	0	*g*	32	16	0
c	16	4	0	*h*	19	8	9½
d	5	8	0	*i*	19	16	0
e	18	0	0	*k*	54	8	0

72.—To find the interest of any sum of money, at any rate per cent. for any number of months.

RULE.—Take the pounds as pence, and multiply by the months and the rate per cent. and divide by 5.

Note. Divide either of the factors first when you can.

Demonstration.—£1. at 1 per cent. for 1 year, is 2¾d. (71) and this divided by 12 (27), (the number of months in one year), will be ¼ of 1d. for 1 month; then, any number of pounds divided by 5, will give the interest, at 1 per cent. in pence, and this sum, multiplied by the rate per cent. and the number of months, will give the required interest.

Example.—£300. at 4 per cent. for 6 months. 300d. ÷ 5 = 60d. or 5*s.* × 4 × 6 = £6. *Ans.*

£.							£.						
80	@	3	℔ cent. for	4	m.	*a*	72	@	4	℔ cent. for	10	m.	*h*
90	..	6	.....	3	..	*b*	35	..	9	.....	6	..	*i*
75	..	4	.....	4	..	*c*	70	..	6	.....	4	..	*k*
120	..	2	.....	3	..	*d*	45	..	7	.....	7	..	*l*
24	..	5	.....	4	..	*e*	78	..	8	.....	5	..	*m*
38	..	7	.....	10	..	*f*	55	..	4	.....	6	.	*n*
48	..	3	.....	5	.	*g*	250	..	4	.....	10	..	*o*

720	@	4	℔ cent. for	5	m.	*a*	845	@	3	℔ cent. for	2	m.	*h*
360	..	3	.....	3	..	*b*	455	..	3	.....	4	..	*i*
240	..	4	.....	4	..	*c*	382	..	4	.....	5	..	*k*
492	..	5	.....	7	..	*d*	234	..	5	.....	6	..	*l*
138	..	3	.....	10	..	*e*	485	..	3	.....	2	..	*m*
252	..	4	.....	5	.	*f*	467	..	10	.....	3	..	*n*
726	..	6	.....	10	..	*g*	672	..	3	.....	10	..	*o*

	£.	*s.*	*d.*		£.	*s.*	*d.*
a	0	16	0	*h*	2	8	0
b	1	7	0	*i*	1	11	6
c	1	0	0	*k*	1	8	0
d	0	12	0	*l*	1	16	9
e	0	8	0	*m*	2	12	0
f	2	4	4	*n*	1	2	0
g	0	12	0	*o*	8	6	8

	£.	*s.*	*d.*		£.	*s.*	*d.*
a	12	0	0	*h*	~~2~~	~~10~~	~~6~~
b	2	14	0	*i*	4	11	0
c	3	4	0	*k*	6	7	4
d	14	7	0	*l*	5	17	0
e	3	9	0	*m*	2	8	6
f	4	4	0	*n*	11	13	6
g	36	6	0	*o*	16	16	0

73.—To find the interest of any sum of money for any number of days.

Rule.—Multiply by the days and rate per cent. and divide by 150, and you will have the answer in pence, excepting you must deduct 1d. for every 6s.; because 30 × 12 = 360, 5 days or $\frac{1}{72}$ short of one year. *add one farthing for every 5£*

Note. Cut off the unit figure, and divide by 15; or, when practicable, divide any of the factors by 3 and 5, and multiply by the result, rejecting the unit figure; the unit figures are tenths of pence.

Demonstration.—If £1. at 1 per cent. will give $\frac{1}{2}$d. for one month (72), it will give $\frac{1}{720}$ for one day, because 30 days in one month.

Example.—£75 at 6 per cent. for 25 days; here we can take $\frac{1}{2}$ and $\frac{1}{5}$ of 25, and = 5 and 2, then 75 × 5 × 2 = 750; reject the 0, it will be 75d. deduct 1d. = 6*s.* 2d. *Ans.*

£.								£.							
60	@	4	℔ cent. for	10	days	*a*		65	@	4	℔ cent. for	21	days	*g*
120	..	7	.....	20	..	*b*		35	..	9	.....	11	..	*h*
84	..	5	.....	15	..	*c*		28	..	4	.....	10	..	*i*
90	..	3	.....	16	..	*d*		240	..	5	.....	12	..	*k*
80	..	5	.....	18	..	*e*		360	..	3	.....	15	..	*l*
75	..	3	.....	17	..	*f*		400	..	6	.....	20	..	*m*
50	@	6	℔ cent. for	19	days	*a*		450	@	2	℔ cent. for	10	days	*g*
60	..	3	.....	8	..	*b*		750	..	6	.....	11	..	*h*
230	..	5	.....	3	..	*c*		300	..	7	.....	28	..	*i*
78	..	3	.....	20	..	*d*		465	..	4	.....	20	..	*k*
60	..	3	.....	13	..	*e*		380	..	5	.....	21	..	*l*
725	..	6	.....	8	..	*f*		600	..	6	.....	29	..	*m*

	£.	*s.*	*d.*		£.	*s.*	*d.*		£.	*s.*	*d.*		£.	*s.*	*d.*
a	0	1	4	*g*	0	2	11½	*a*	0	3	1½	*g*	0	4	11½
b	0	9	2½	*h*	0	1	10½	*b*	0	0	9½	*h*	1	7	1½
c	0	3	5½	*i*	0	0	7½	*c*	0	1	10½	*i*	1	12	2½
d	0	2	4½	*k*	0	7	10½	*d*	0	2	6½	*k*	1	0	4½
e	0	3	11½	*l*	0	8	10½	*e*	0	1	4½	*l*	1	1	10½
f	0	2	1½	*m*	1	6	3½	*f*	0	19	1	*m*	2	17	2½

APPENDIX.

ON TEACHING THE TABLES.—(No 1.)

A thorough knowledge of the tables is indispensably necessary to the Mental Arithmetician; not a mere knowledge from memory, but one arising from a clear perception of the various combination of numbers. The best method of attaining this is for the pupil to write his own tables, not from copies, but from his own calculations, after the manner of the following examples:—

Multiplication.	*Mult. of Pence.*	*Mult. of Shillings.*
	d.	*s.* *d.*	*s.*	*£.* *s.* *d.*
5 × 5 = 25	7 × 5 = 2 11	9 × 5 = 2 5 0
5 .. 6 .. 30	7 .. 6 .. 3 6	9 .. 6 .. 2 14 0
5 .. 7 .. 35	7 .. 7 .. 4 1	9 .. 7 .. 3 3 0
5 .. 8 .. 40	7 .. 8 .. 4 8	9 .. 8 .. 3 12 0
5 .. 9 .. 45	7 .. 9 .. 5 3	9 .. 9 .. 4 1 0
5 .. 10 .. 50	7 .. 10 .. 5 10	9 .. 10 .. 4 10 0

ANOTHER WAY.

	d.	*s.* *d.*	*s.*	*£.* *s.* *d.*
13 × 3 = 39	39 =	3 3	39 =	1 19 0
13 .. 4 .. 52	52 ..	4 4	52 ..	2 12 0
13 .. 5 .. 65	65 ..	5 5	65 ..	3 5 0
13 .. 6 .. 78	78 ..	6 6	78 ..	3 18 0
13 .. 7 .. 91	91 ..	7 7	91 ..	4 11 0
13 .. 8 .. 104	104 ..	8 8	104 ..	5 4 0
13 .. 9 .. 117	117 ..	9 9	107 ..	5 17 0
13 .. 10 .. 130	130 ..	10 10	130 ..	6 10 0
13 .. 11 .. 143	143 ..	11 11	143 ..	7 3 0
13 .. 12 .. 156	156 ..	13 0	156 ..	7 16 0

Following out the same plan throughout all the tables, with frequent oral repetitions and cross questioning, until they are perfectly known without calculating. The pupils should be encouraged to answer in the shortest way; thus, instead of saying 7 × 11 = 77, 77d. = 6s. 5d. say 11 times 7d. = 6s. 5d. Tables of Weights and Measures, &c. cannot be made out by calculating, but still they may be wrote out upon slate or paper, either from the book or from dictation, until the pupils can write them from memory.

(No. 2.)—Multiplication Tables.

1	2	3	4	5	6	7	8	9	10	11	12
2	4	6	8	10	12	14	16	18	20	22	24
3	6	9	12	15	18	21	24	27	30	33	36
4	8	12	16	20	24	28	32	36	40	44	48
5	10	15	20	25	30	35	40	45	50	55	60
6	12	18	24	30	36	42	48	54	60	66	72
7	14	21	28	35	42	49	56	63	70	77	84
8	16	24	32	40	48	56	64	72	80	88	96
9	18	27	36	45	54	63	72	81	90	99	108
10	20	30	40	50	60	70	80	90	100	110	120
11	22	33	44	55	66	77	88	99	110	121	132
12	24	36	48	60	72	84	96	108	120	132	144

(No. 3.)

1	13	14	15	16	17	18	19	20
2	26	28	30	32	34	36	38	40
3	39	42	45	48	51	54	57	60
4	52	56	60	64	68	72	76	80
5	65	70	75	80	85	90	95	100
6	78	84	90	96	102	108	114	120
7	91	98	105	112	119	126	133	140
8	104	112	120	128	136	144	152	160
9	117	126	135	144	153	162	171	180
10	130	140	150	160	170	180	190	200
11	143	154	165	176	187	198	209	220
12	156	168	180	192	204	216	228	240

(No. 4.)

	13	14	15	16	17	18	19	20
13	169	182	195	208	221	234	247	260
14	182	196	210	224	238	252	266	280
15	195	210	225	240	255	270	285	300
16	208	224	240	256	272	288	304	320
17	221	238	255	272	289	306	323	340
18	234	252	270	288	306	324	342	360
19	247	266	285	304	323	342	361	380
20	260	280	300	320	340	360	380	400

(No. 5.)—Tables of Money.

Current Coin.			*Obsolete Money.*			
4 Farthings	= 1	Penny.		4d.	= 1	Groat.
12 Pence	.. 1	Shilling.	6s.	8d.	.. 1	Noble.
30 Pence	.. ½	Crown.	10s.	0d.	.. 1	Angel.
5 Shillings	.. 1	Crown.	13s.	4d.	.. 1	Mark.
10 Shillings	.. ½	Sovereign.	21s.	0d.	.. 1	Guinea.
20 Shillings	.. 1	Sovereign.	27s.	0d.	.. 1	Moidore.

(No. 6.)—Farthings, Pence, and Shillings' Tables.

d.		*qrs.*	*s.*	*d.*	*d.*		*£.*	*s.*	*d.*
1	=	4		1 = 12	20	are	0	1	8
1½	..	6		2 .. 24	30	..	0	2	6
2	..	8		3 .. 36	40	..	0	3	4
2½	..	10		4 .. 48	50	..	0	4	2
3	..	12		5 .. 60	60	..	0	5	0
3½	..	14		6 .. 72	70	..	0	5	10
4	..	16		7 .. 84	80	..	0	6	8
4½	..	18		8 .. 96	90	..	0	7	6
5	..	20		9 .. 108	100	..	0	8	4
5½	..	22		10 .. 120	200	..	0	16	4
6	..	24		11 .. 132	300	..	1	5	0
6½	..	26		12 .. 144	400	..	1	13	4
7	..	28		13 .. 156	500	..	2	1	8
7½	..	30		14 .. 168	600	..	2	10	0
8	.	32		15 .. 180	700	..	2	18	4
8½	..	34		16 .. 192	800	..	3	6	8
9	..	36		17 .. 204	900	..	3	15	0
9½	..	38		18 .. 216	1000	..	4	3	4
10	..	40	£.	19 .. 228	1100	..	4	11	8
10½	..	42	1 =	20 .. 240	1200	..	5	0	0
11	..	44	2 ..	40 .. 480	1300	..	5	8	4
11½	..	46	3 ..	60 .. 720	1400	..	5	16	8
12	..	48	4 ..	80 .. 960	1500	..	6	5	0
12½	..	50	5 ..	100 .. 1200	1600	..	6	13	4
13	..	52	6 ..	120 .. 1440	1700	..	7	1	8
13½	..	54	7 ..	140 .. 1680	1800	..	7	10	0
14	..	56	8 ..	160 .. 1920	1900	..	7	18	4
14½	..	58	9 ..	180 .. 2160	2000	..	8	6	8
15	..	60	10 ..	200 .. 2400	2100	..	8	15	0
15½	..	62	11 .	220 .. 2640	2200	..	9	3	4
16	..	64	12 ..	240 . 2880	2300	..	9	11	8
16½	..	66	13 ..	260 .. 3120	2400	..	10	0	0

COMMERCIAL TABLES.

(7) COMMERCIAL NUMBERS.

12 Articles ..... 1 Dozen
20 ..... 1 Score
144 ..... 1 Gross

(8) MEASURES OF WEIGHT.

Avoirdupois Weight.

16 drams .... 1 ounce
16 ounces .... 1 pound
14 pounds .... 1 stone
28 pounds .... 1 qr. cwt.
4 quarters.... 1 cwt.
20 cwt..... 1 ton

Troy Weight.

24 grains..... 1 pennywt
20 pennywts.... 1 ounce
12 ounces ..... 1 pound

Apothecaries' Weight.

20 grains..... 1 scruple
3 scruples .... 1 drachm
8 drachms .... 1 ounce
12 ounces .... 1 pound

Wool Weight.

14 pounds.... 1 stone
2 stones..... 1 tod
6½ tods..... 1 wey
2 weys .. .. 1 sack
12 sacks..... 1 last

(9) *Measures of Length.*

12 inches.... 1 foot
3 feet..... 1 yard
5½ yards.... 1 pole
40 poles..... 1 furlong
8 furlongs... 1 mile
3 miles..... 1 league
4 inches.... 1 hand
2 yards..... 1 fathom
1760 yards..... 1 mile

Cloth Measure.

2¼ inches..... 1 nail
4 nails..... 1 quarter
4 quarters..... 1 yard
5 quarters .... 1 ell

(10) *Measure of Surface.*

144 sq. inches.. 1 sq. foot
9 sq. feet.... 1 sq. yard
30¼ sq. yards.. 1 sq. perch
40 sq. perches 1 sq. rood
4 sq. roods .. 1 sq. acre
640 sq. acres .. 1 sq. mile

Land is measured by the chain of 22 yards.

100 links..... 1 chain
10 chains..... 1 acre

(11) *Measure of Solidity.*

1728 inches..... 1 foot
27 feet..... 1 yard

(12) *Liquids.*

4 gills..... 1 pint
2 pints..... 1 quart
4 quarts..... 1 gallon

Particular Measures for Ale.

1 firkin ..... 9 gallons
1 kilderkin.... 18 ..
1 barrel ..... 36 ..
1 hogshead.... 54 ..
1 butt..... 108 ..

Particular Measures for Wine.

1 anker..... 10 gallons
1 runlet..... 20 ..
1 tierce..... 42 ..
1 hogshead.... 63 ..
1 puncheon.... 84 ..
1 pipe..... 126 ..
1 tun..... 252 ..

(13) *Particular Measures for Dry Goods.*

1 peck..... 2 gallons
1 bushel..... 4 gallons
1 load..... 3 bushels
1 sack..... 4 bushels
1 quarter..... 8 bushels

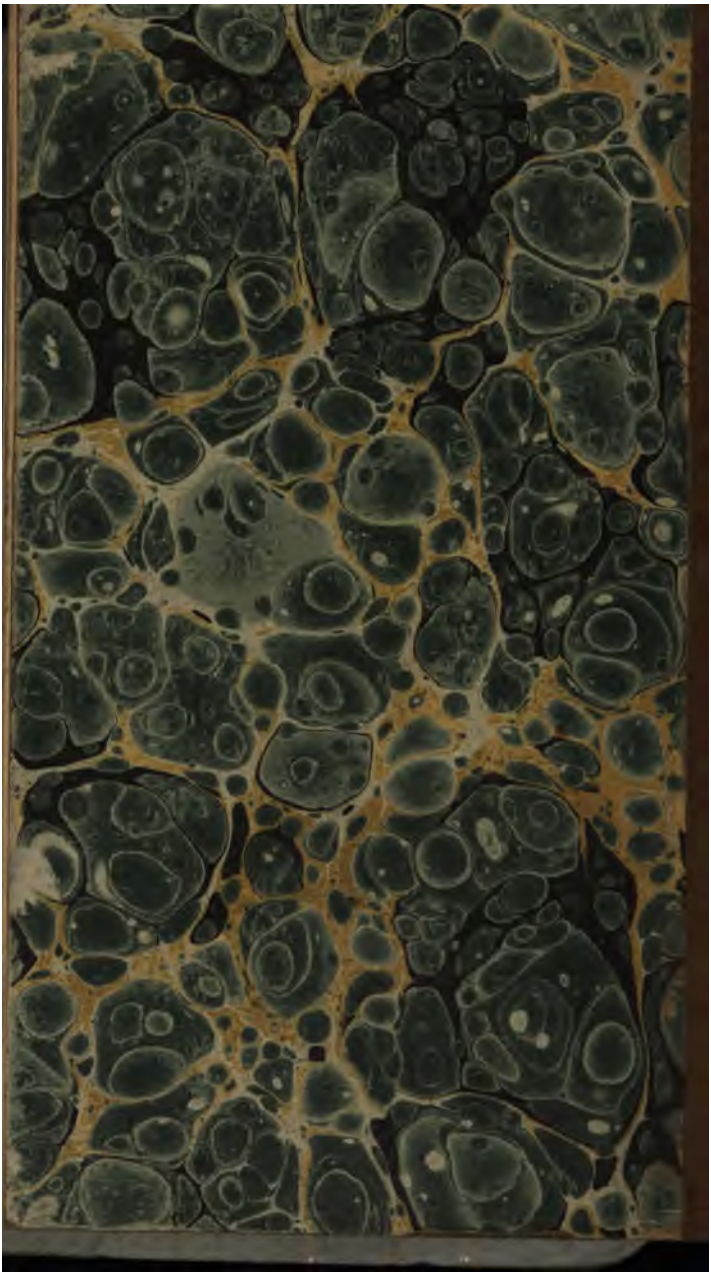
COMMERCIAL TABLES CONTINUED.

Imperial Measures of Capacity, for Potatoes & Fruit.	*Measure of Time continued.*
2 gallons .... 1 peck	28, 29, 30, or 31 days one calendar month.
8 gallons .... 1 bushel	12 calendar months 1 year
3 bushels .... 1 sack	365 days... 1 common year
13 sacks ..... 1 chaldron	366 days... 1 leap year

(14) *Measure of Time.*	(15) *Angular Measure.*
60 seconds .. 1 minute	60 seconds.. 1 minute
60 minutes .. 1 hour	60 minutes... 1 degree
24 hours .... 1 day	30 degrees.. 1 sign
7 days .... 1 week	90 degrees.. 1 quadrant
28 days..... 1 month	360 degrees..12 signs

Thirty days hath September,
April, June, and November,
February hath twenty-eight alone,
And all the rest hath thirty-one;
Excepting leap year, at which time,
February's days are twenty-nine.

ERRATUM.—Page 24, for "1 lb. at 10*s.* per lb." read "1 lb. at 10*s.* per cwt."

DONCASTER:

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